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DEPARTMENT OF WATER RESOURCES

BULLETIN No. 178-76

WATERMASTER SERVICE IN
THE RAYMOND BASIN

Los Angeles County

July 1, 1975 - June 30, 1976

AUGUST 1976

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Secretary for Resources
The Resources Agency

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Governor
State of California

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FOREWORD

The Department of Water Resources, as Watermaster, is pleased to submit this report of water supply conditions in the Raymond Basin during fiscal year 1975-76. It is prepared annually in accordance with the provisions of the Los Angeles County Superior Court Judgment in the Raymond Basin. The Judgment, together with Part 4, Division 2, of the California Water Code, authorizes this publication and the Department's administration of the Watermaster Service Area.

The report covers the scope of the Watermaster's work, conditions of ground water supply, water use, ground water replenishment, variations from guidelines in the Judgment and a complete financial report for fiscal year 1975-76.

The Watermaster wishes to acknowledge and express his appreciation for the assistance and support received from the public and private organizations and individuals whose contributions were essential to this report.

The success of Watermaster Service is dependent on the continuing cooperation and communication between the Watermaster and the public that he serves.

The Watermaster requests your suggestions to assist him in responding to your requirements.



Jack J. Coe, Chief
Southern Division
and Watermaster
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I. THE RAYMOND BASIN

A reliable source of potable ground water is a valuable asset to any community. The Raymond Basin, in the northwest corner of the San Gabriel Valley, is such a source for the cities of Alhambra, Arcadia, Monrovia, Pasadena, San Marino, Sierra Madre, and the communities of Altadena and La Canada. Watermaster Service provided by the State Department of Water Resources (DWR) helps to protect the rich supply of ground water for residents and industries. Figure 1 depicts water service areas of the parties.

The Raymond Basin is a small triangular ground water reservoir flanked by mountains on the north and west. The southern side is bounded by a seven-mile-long impervious dike formed by the Raymond Fault, which effectively separates the Raymond Basin from the San Gabriel Valley Basin.

Ground water has always had an impact on the people who live and work in the Raymond Basin. Most of the Basin's 103.6 square kilometre (40-square-mile) area is urban-suburban and its cities use large amounts of fresh water daily, a substantial portion of which is pumped directly from the Basin.

Some years ago, when the ground water supply was endangered by rapidly falling water levels, timely legal action by water users halted the overdraft and prevented serious damage to the Basin. To prevent eventual depletion of ground water, the Judgment limited each party to a specific annual extraction. In 1955, provisions in the original Judgment were modified, increasing water rights to 37 772 237 cubic metres (30,622 acre-feet); they are now referred to as "Decreed Right, 1955". Certain variances were permitted, but no variance could prevail beyond a five-year period. The variances in use of water rights were not changed until June 24, 1974, when the five-year variances were changed to 10 percent per year.

All water used in the Basin, particularly ground water, is monitored by a court-appointed Watermaster who reports all significant water-related events occurring in the Basin to the Superior Court and parties to the Judgment.

Functions of the Watermaster

Accurate measurement of ground water extractions is essential to the success of the Basin's management plan. The Watermaster calibrates the water meter on every active water well at least once every two years and uses every available means, including system efficiency tests, to confirm watermeter tests. Inaccurate meters must be repaired within 30 days. Follow-up tests on repaired meters and initial tests on new wells are scheduled whenever necessary.

Once a month, the Watermaster receives ground water extraction reports from pumpers and updates each water right account by computing the amounts pumped during the previous month and current fiscal year. These data establish the amount that may legally be extracted by each pumper during the rest of the year.



DEPARTMENT OF WATER RESOURCES, SOUTHERN DIVISION, 1976



DEPARTMENT OF WATER RESOURCES, SOUTHERN DIVISION, 1976

Figure 1. WATER SERVICE AREAS OF PARTIES TO WATERMASTER SERVICE, JUNE 1976

In each spring and fall, the Watermaster measures depth to static ground water level in about 115 wells throughout the Basin and prepares fall and spring contour maps of the ground water surface and a "fall-to-fall" map showing lines of equal elevation changes in a one-year period. He also maintains nine stream-gaging stations to measure surface flow.

The Watermaster began a sewage outflow measurement program during the 1968-69 season, using F-type water-stage recorders on 12 major sewage trunk lines. The program was not implemented during the 1973-74, 1974-75, and 1975-76 seasons.

Summary of Operating Conditions

Table 1 compares statistics for the last two water years and shows the substantial effect this year's low precipitation has had on operating conditions. Rainfall in the Raymond Basin was only 50% of normal. Both ground water extractions and net water use were the highest since the Judgment was entered in 1944. The effect of the low precipitation is also seen in the large decrease in diversions and increase in imports.

Table 1. SUMMARY OF OPERATING CONDITIONS

Item	1974-75 Fiscal Year	1975-76 Fiscal Year	Percent of change from previous fiscal year
Parties, number of	18	18	0
Active pumpers, number of	18	18	0
Active nonparties, number of	2	2	0
Watermaster expenses	\$39,434.28	\$44,460.88	+ 13
Watermaster expenses per acre-foot ^{a/} pumped	1.23	1.23	0
Valley rainfall, in inches ^{b/}	16.94	10.93	- 35
Runoff, in acre-feet			
Inflow	4,993	4,812	- 4
Outflow	9,578	5,634	- 41
Spreading operation, in acre-feet	5,088	3,041	- 40
"Decreed Right", in acre-feet	30,622	30,622	0
Extractions inside basin, in acre-feet	31,810	36,176	+ 14
Diversions, in acre-feet	3,281	2,573	- 22
Imports, in acre-feet	24,130	26,615	+ 10
Exports, in acre-feet	- 10,290	- 10,450	+ 2
Net Water Use, in acre-feet	48,931	54,914	+ 12

a/ 1 acre-foot = 1 233 cubic metres

b/ 1 inch = 25.4 millimetres

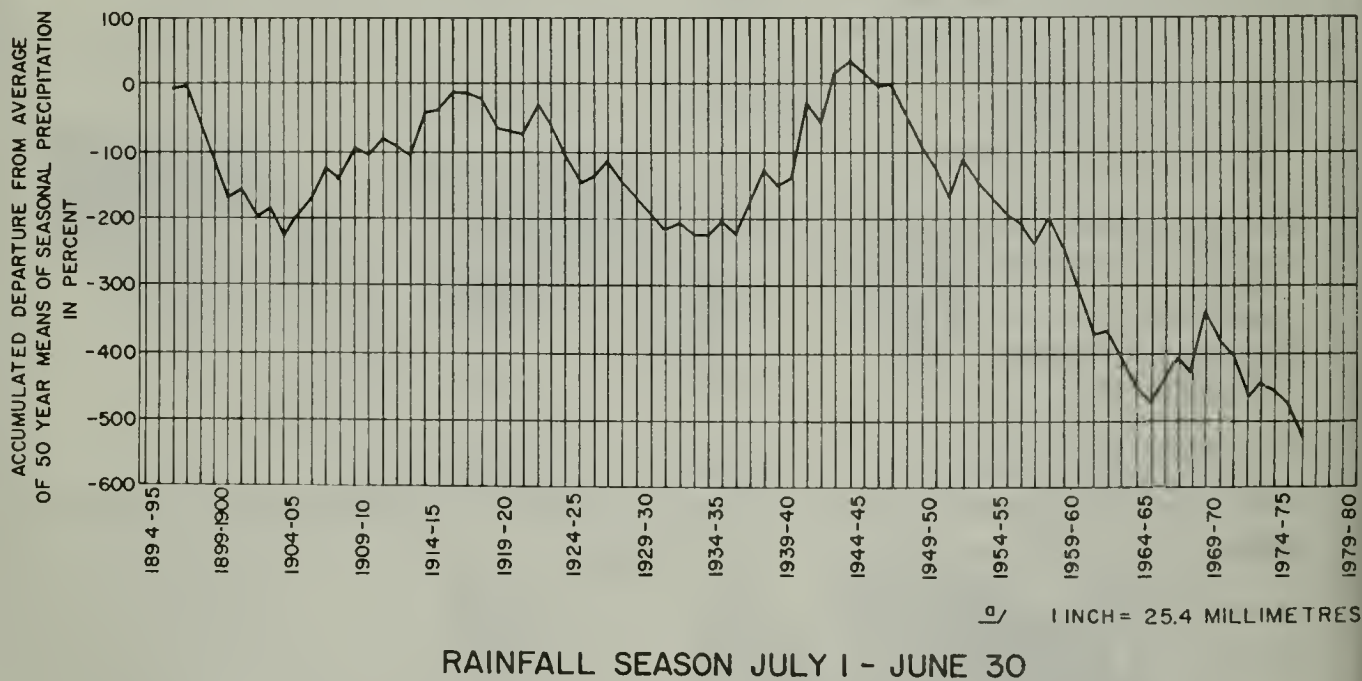
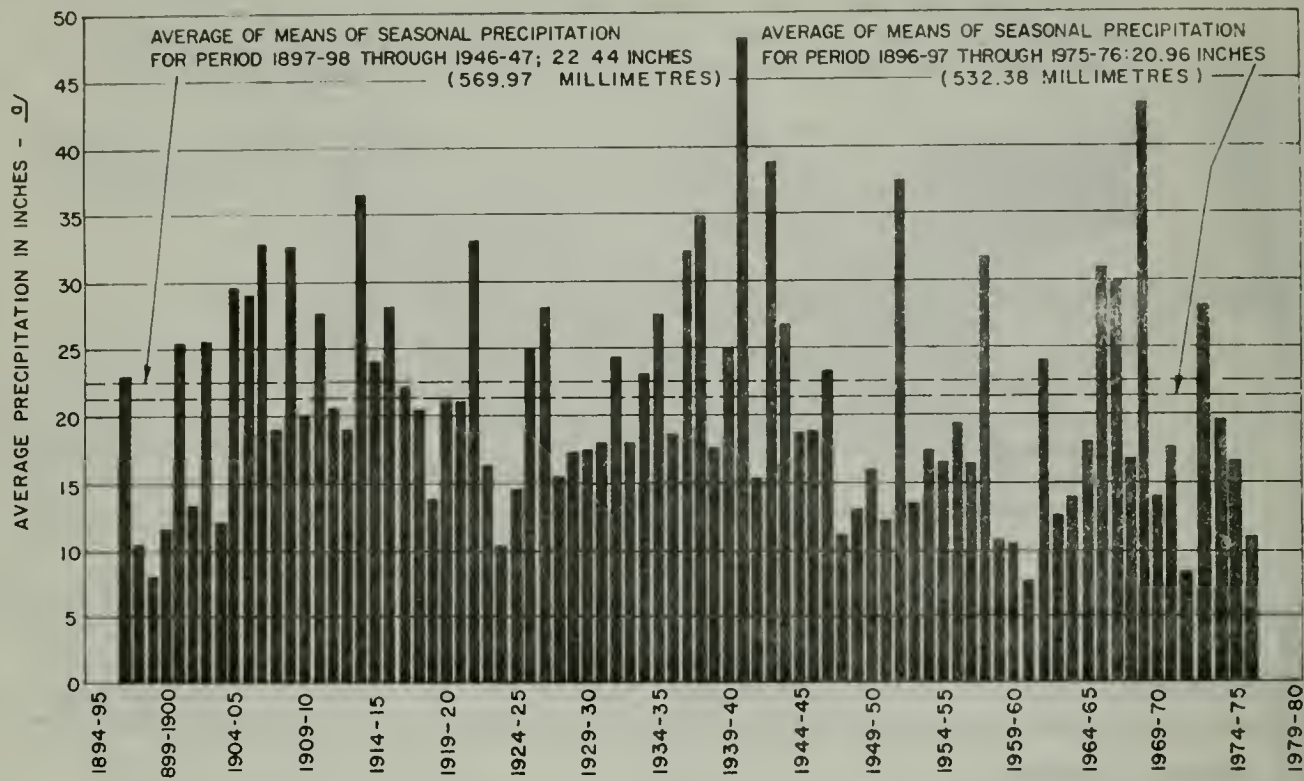


Figure 2. RAINFALL CHARACTERISTICS OF VALLEY STATIONS, 1896 - 1976

2. WATER SUPPLY

Southern California's urban economy depends on Colorado River, Owens River, and Northern California water, mountain runoff, ground water, reclaimed waste water, and desalinated water. These sources contribute to one of the world's largest water supply systems.

Precipitation

The ground water supply of the highly permeable Raymond Basin could be considerably influenced by local precipitation. Natural replenishment occurs readily when water has time to percolate into a storage zone. Unfortunately, most of the Basin is urban and much of its surface is paved with asphalt and concrete that channel the runoff before it can replenish the ground water.

Long-term precipitation trends are shown in Figure 2, in which a downward slope indicates a continued dry period and an upward slope an above-normal increase in precipitation. The curve of cumulative departures from the mean shows the relative magnitude of the drought that began in 1944.

During the 1975-76 season, precipitation was about 50 percent of the long-time mean at valley stations and about 55 percent of the mean at mountain stations (Table 2). The below-normal precipitation during the past season continued the downward slope of the previous year.

Salvage Credit for City of Sierra Madre

The City of Sierra Madre spreads local street runoff and water diverted from Santa Anita Creek and Sierra Madre Wash. Essentially, the City uses

Table 2. PRECIPITATION
in inches^{a/}

Station		Period of record in years ^{b/}	1974-75	1975-76	50-year mean	
Name	Type					
	Valley					Moun- tain
Altadena Golf Course	X		79	15.64	9.30	23.11
Highland Park	X		81	16.20	8.49	18.52 ^{c/}
La Canada	X		64	17.97	11.82	23.20 ^{c/}
Mt. Wilson Observatory		X	42	34.01	22.54	36.40 ^{c/}
Oakwilde		X	49	16.55	10.65	28.19 ^{c/}
Opid's Camp		X	59	23.64	22.18	41.19 ^{c/}
Pasadena Chlorine Plant		X	60	17.14	12.11	23.40 ^{c/}
Bailey Debris Basin ^{b/}	X	X	81	17.91	14.10	25.00 ^{c/}
Upper Haine's Canyon		X	58	25.24	20.59	30.06 ^{c/}
Waterman Guard Station		X	49	23.11	17.38	27.72 ^{c/}
Seasonal Average	X			16.94	10.93	22.44
		X		22.50	17.08	30.63

a/ 1 inch = 2.54 centimetres.

b/ Includes replaced station.

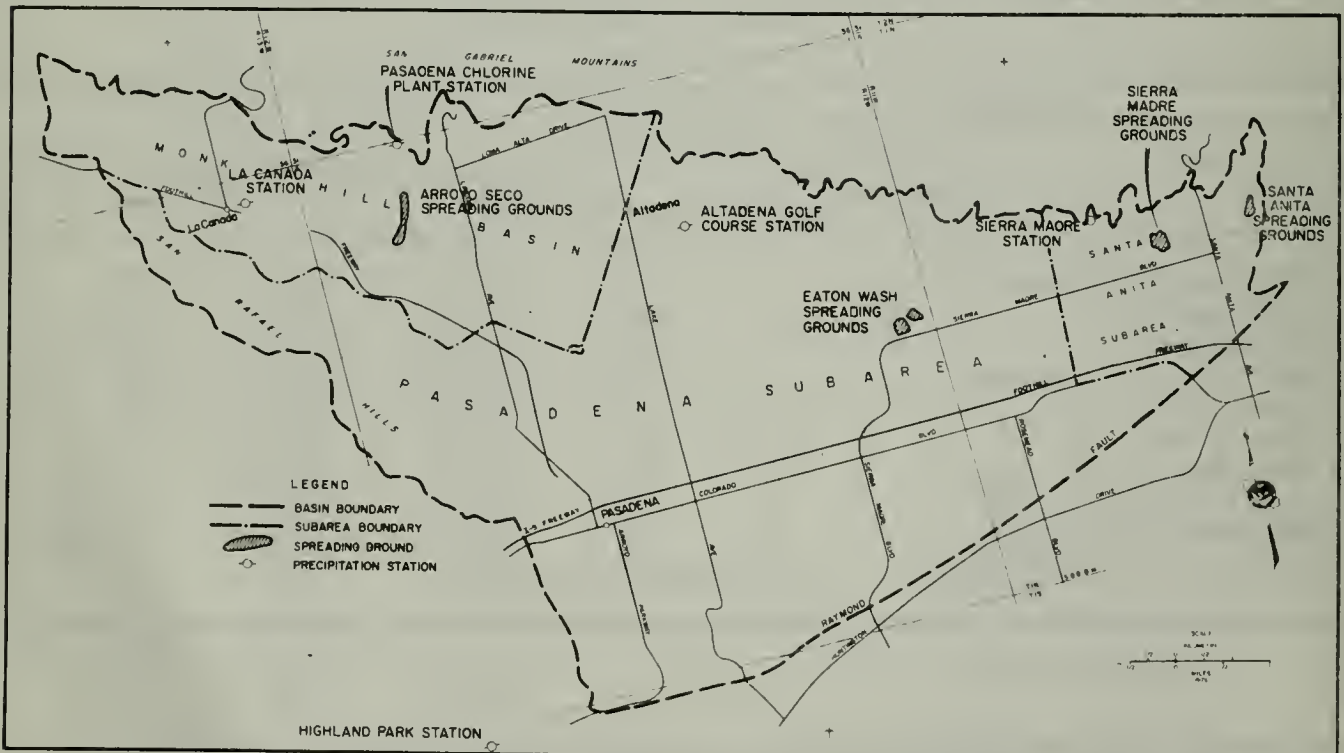
c/ Substituted for Sierra Madre.

d/ Estimated.

Table 3. CREDIT FOR WATER SPREAD BY CITY OF SIERRA MADRE

In acre-feet (1 acre-foot = 1 233 cubic metres)

Season	(1) Salvage water at beginning of year	Water spread for salvage			(5) Salvage water lost to subsurface outflow	(6) Salvage water extracted	(7) Salvage water at end of year (1)+(4)-(5)-(6)=(7)
		(2) Amount	(3) Lost through natural percolation	(4) Water Stored (2)-(3)=(4)			
1951-52	0	1,937.0	526.9	1,410.1	124.4	449.4	836.3
52-53	836.3	258.0	94.6	163.4	243.1	334.9	421.7
53-54	421.7	580.0	4.6	575.4	115.4	596.1	285.6
54-55	285.6	341.0	21.5	319.5	15.1	559.1	30.9
55-56	30.9	429.0	90.9	338.1	9.6	128.0	231.4
56-57	231.4	331.0	167.1	163.9	42.1	62.0	291.2
57-58	291.2	3,409.0	811.9	2,597.1	278.8	0.0	2,609.5
58-59	2,609.5	1,308.0	521.0	787.0	945.1	37.5	2,413.9
59-60	2,413.9	45.0	10.4	34.6	705.6	208.2	1,534.7
1960-61	1,534.7	51.0	16.0	35.0	214.1	1,116.3	239.3
61-62	239.3	1,283.0	445.6	837.4	43.1	292.9	740.8
62-63	740.8	1,121.0	554.4	576.6	241.7	253.9	821.8
63-64	821.8	699.0	164.4	534.6	180.2	451.3	724.9
64-65	724.9	904.0	208.0	695.4	142.8	837.3	440.2
65-66	440.2	4,233.0	979.0	3,254.0	533.5	433.1	2,727.6
66-67	2,727.6	4,537.0	945.1	3,591.9	1,110.9	0.0	5,208.6
67-68	5,208.6	2,625.0	1,069.2	1,555.8	1,663.1	0.0	5,101.3
68-69	5,101.3	2,984.0	371.9	2,612.1	1,532.3	0.0	6,181.1
69-70	6,181.1	1,529.3	932.2	597.1	1,495.5	0.0	5,282.7
1970-71	5,282.7	1,145.3	369.7	775.6	1,285.7	0.0	4,772.6
71-72	4,772.6	1,014.4	311.5	702.9	1,518.3	0.0	3,957.2
72-73	3,957.2	3,204.0	824.5	2,379.5	815.1	84.7	5,436.9
73-74	5,436.9	3,029.1	891.9	2,137.2	1,603.7	64.7	5,905.7
74-75	5,905.7	2,244.0	927.8	1,316.2	1,744.1	1,161.0	4,316.8
75-76	4,316.8	1,029.8	387.3	642.5	1,299.5	784.0	2,875.8
TOTALS		40,270.9	11,647.4	28,632.9	17,902.8	7,854.4	



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Figure 3. PRECIPITATION STATIONS AND SPREADING GROUNDS

the Eastern Unit (identical to Santa Anita Subarea - see Figure 1) as a storage facility, a privilege obtained several years ago by agreement with Arcadia. The Watermaster determines the total quantity spread in the Sierra Madre Grounds and credits the City with the portion that is not part of the natural replenishment of the Eastern Unit. This is called "salvage credit" water. It may not be pumped by the City until both its exchange water purchase, if any, and decreed right are fully used. Salvage credit remaining at the end of each season since 1951 is summarized in Table 3. The City pumped 967 064 cubic metres (784 acre-feet) of its salvage credit water during the past season and lost 1 602 316 cubic metres (1,299 acre-feet) of the stored water through subsurface outflow.

Ground Water Recharge

Overdraft occurs when ground water is extracted more rapidly than it is replaced by nature. Ground water aquifers recharge themselves so slowly that a few years of concentrated pumping can upset a balance that took centuries to establish. This was the situation in the Raymond Basin several years ago.

Today, several methods of artificial recharge are being used to reestablish and maintain nature's balance. One of these is spreading. Areas are flooded with water that percolates into aquifers and supplements the natural supply. Large quantities can be returned to the ground by spreading, but the process is limited by the space available and the capacity of the Basin to accept the water.

The Los Angeles County Flood Control District (LACFCD) operates three spreading grounds in the Raymond Basin -- Arroyo Seco, Eaton Wash, and Santa Anita Grounds (Figure 3). Another project, the Sierra Madre Grounds, is operated by the City of Sierra Madre. Since the spread water is added directly to the Raymond Basin, water levels near the spreading grounds, especially the Eastern Unit and Monk Hill Basin, reflect the additions quickly. Spreading thus benefits all parties in the Basin greatly (Table 4).

Table 4. WATER SPREAD FOR GROUND WATER RECHARGE

Participant	Spreading Ground	Source	Acre-feet ^{a/}
LACFCD	Arroyo Seco	Arroyo Seco	281.50 ^{b/}
	Eaton Wash	Eaton Canyon	133.30 ^{c/}
	Santa Anita	Santa Anita Canyon	19.70
Kinneloa Irrigation District ^{d/}	Eaton Wash ^{e/}	Kinneloa Canyon	3.51
Las Flores Water Company ^{d/}	Rubio Canyon Debris Basin ^{e/}	Las Flores Canyon	25.95
Lincoln Avenue Water Company ^{d/}	Arroyo Seco ^{e/}	Millard & El Prieto Canyons	390.97
Pasadena, City of ^{d/}	Arroyo Seco ^{e/}	Arroyo Seco	84.35
	Eaton Wash ^{e/}	Eaton Canyon	979.40
Rubio Canon Land & Water Assoc. ^{d/}	Rubio Canyon Debris Basin ^{e/}	Rubio Canyon	92.27
Sierra Madre, City of	Sierra Madre	Santa Anita Canyon, Little Santa Anita Canyon, and Street Runoff	1,029.80
TOTAL			3,040.75

a/ 1 acre-foot = 1 233 cubic metres.

b/ Does not include 967 acre-feet percolation at Devil's Gate Dam.

c/ Does not include 296 acre-feet estimated percolation at Eaton Wash Reservoir.

d/ Pursuant to program for spreading credit.

e/ Major part of percolation occurs in the streambed.

Program for Spreading Credit

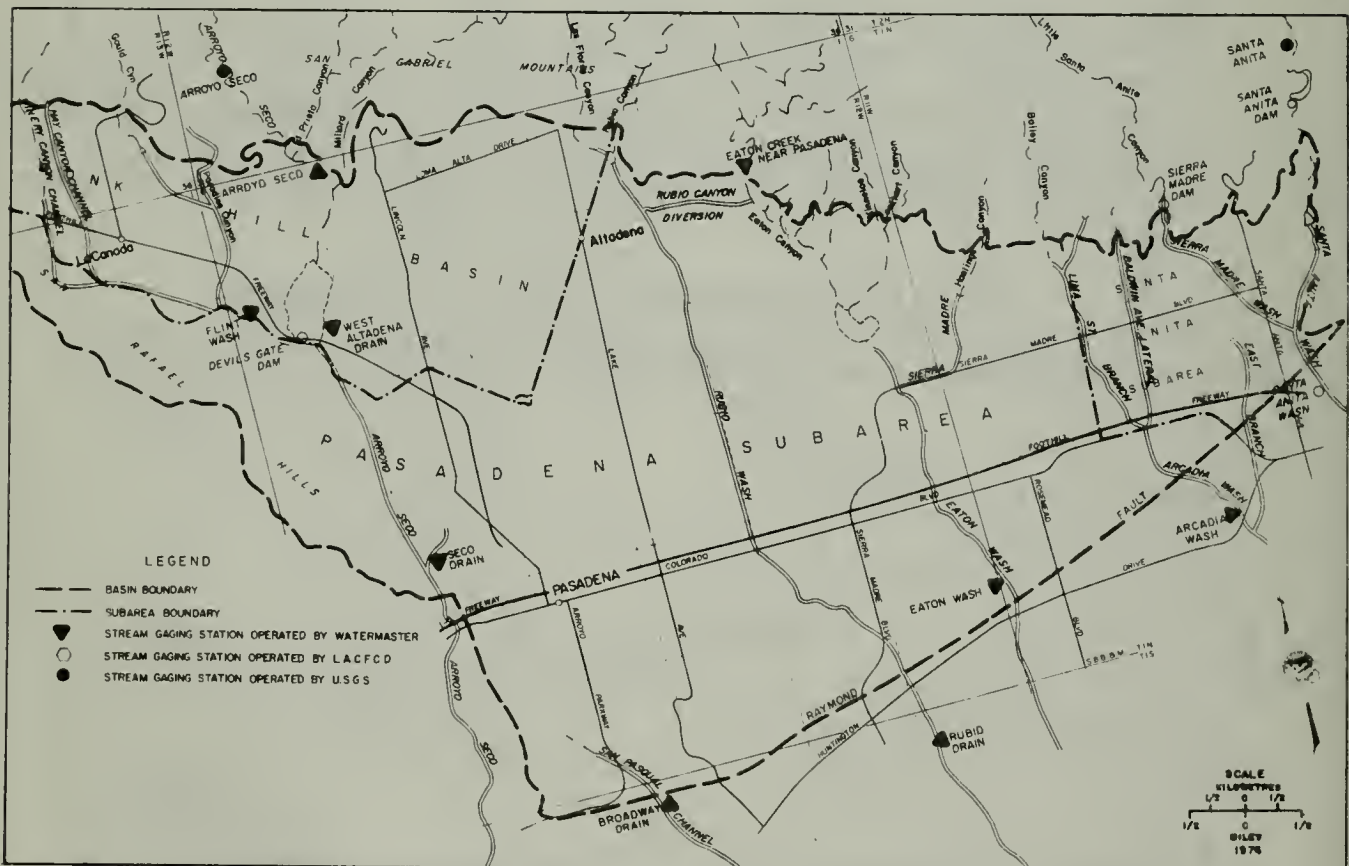
On January 17, 1974, the Court approved a Modification of the Judgment allowing parties having surface diversion rights to spread their diversions for future recapture by pumping from their wells. The program had begun on May 1, 1973. The parties electing to participate in this program are:

Kinneloa Irrigation District
Las Flores Water Company
Lincoln Avenue Water Company
City of Pasadena
Rubio Canon Land and Water Association

The inception of the program and its implementation are discussed in Chapter 4.

Runoff

Thirteen stream-gaging stations are used to determine the volume of surface water moving through the Raymond Basin. The Watermaster operates nine and the LACFCD operates four (Figure 4). Appendix A summarizes information collected at stations operated by the Watermaster. The seasonal summary of "measured" flow at each gaging station appears in Table 5.



DEPARTMENT OF WATER RESOURCES, SOUTHERN DIVISION, 1976

Figure 4. STREAM-GAGING STATIONS

Table 5. RAYMOND BASIN RUNOFF

Watermaster Stream-gaging Stations		1975-76
No.	Name	Flow, in acre-feet ^{a/}
<u>Monk Hill Basin Flow into Devil's Gate Reservoir</u>		
62190	Flint Wash	388
62985	West Altadena Drain	<u>259</u>
TOTAL INTERNAL FLOW		647
<u>Inflow to Raymond Basin</u>		
62250	Arroyo Seco ^{b/}	511
	City of Pasadena Diversions	<u>1,856</u>
Subtotal		2,367
75360	Eaton Creek near Pasadena ^{b/}	1,011
d/	Santa Anita Dam ^{b/}	<u>1,434</u>
TOTAL INFLOW		4,812
<u>Outflow from Raymond Basin</u>		
d/	Devil's Gate Dam	372
62150	Seco Drain	788
75135	Broadway Drain	833
75220	Rubio Drain	2,026
75300	Eaton Wash	<u>446</u>
75450	Arcadia Wash	816
d/	Santa Anita Wash	<u>353</u>
TOTAL OUTFLOW		5,634

a/ 1 acre-foot = 1 233 cubic metres.

b/ Includes water diverted to spreading ground within the basin.

c/ City of Pasadena claimed 979.40 acre-feet for spreading credit.

d/ Operated by Los Angeles County Flood Control District.

Ground Water Elevations

During the past season, the Watermaster collected and processed data to determine prevailing ground water conditions in the Raymond Basin. Figure 5 shows the elevations of the ground water table during the fall of 1975. Figure 6 represents the water table in the spring of 1976 at the end of the rainy season. Figure 7 shows the changes in elevation in the water table between the 1974 and 1975 fall seasons.

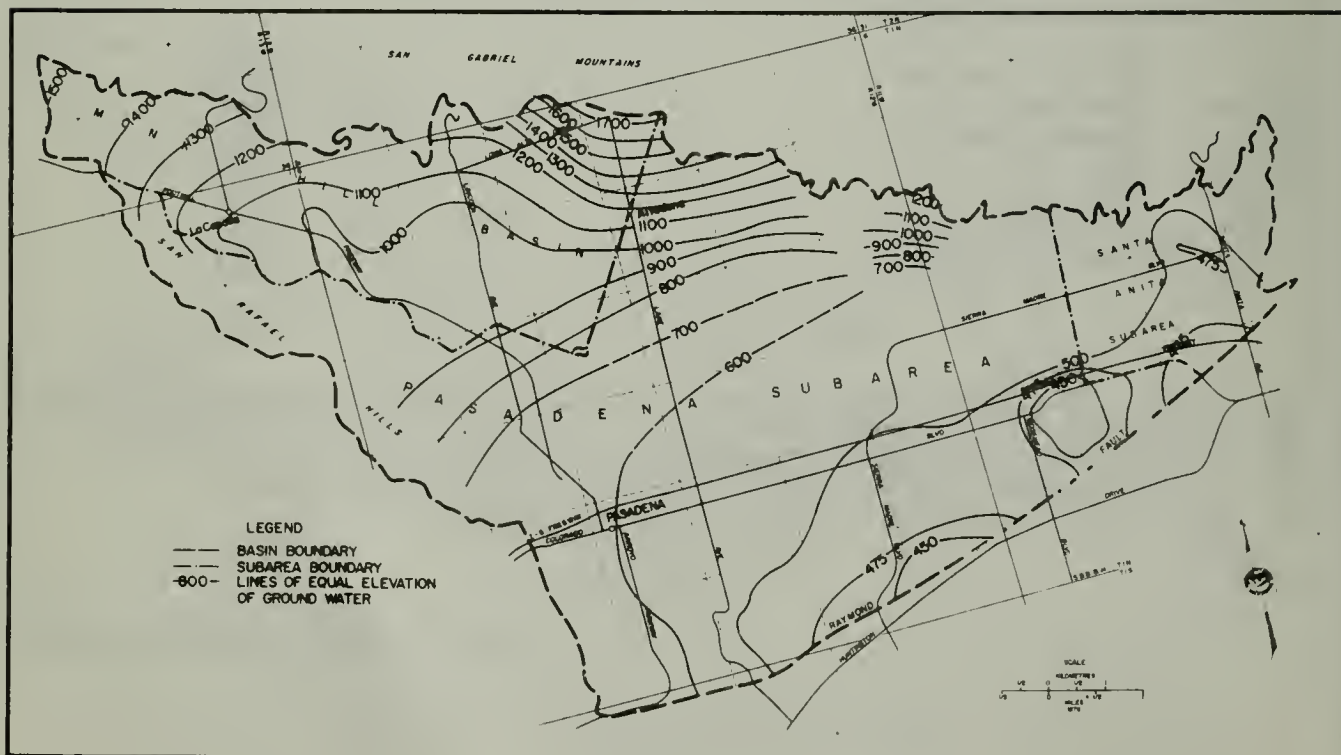
Hydrographs depicting historic ground water table fluctuations in selected wells in the Raymond Basin are shown in Figures 8, 9, and 10. The sites of these wells appear in Figure 11. Many more hydrographs are available for inspection in the Watermaster's Office.

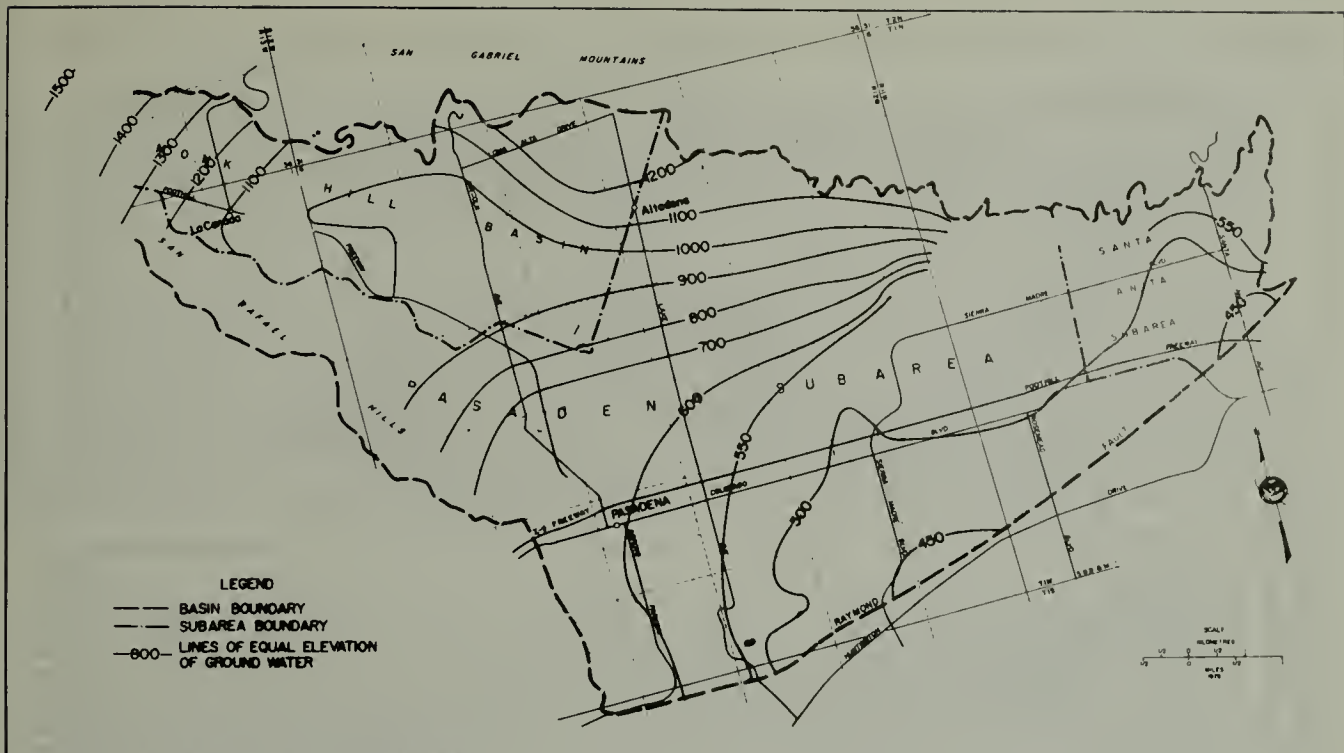
Although the 1975-76 rainfall was below seasonal average, there was some increase in water levels in the central portion of the Pasadena Subarea and the central portion of the Monk Hill Basin as a result of the spreading program by certain parties.

Pumping Limitations in the Eastern Unit

The water elevations of the City of Arcadia's Orange Grove wells govern the limitation of pumping in the Eastern Unit of the Raymond Basin. The limitation is imposed if the water surface at the Arcadia group of wells drops below an elevation of 152.4 metres (500 feet) above sea level. The limitation reduces the annual extraction from the Eastern Unit during the following season from 6 525 215 cubic metres (5,290 acre-feet) to 4 022 444 cubic metres (3,261 acre-feet). Because the water surface was above the 500-foot limit during spring 1975, the limitation of pumping will not be in effect during the 1976-77 season.

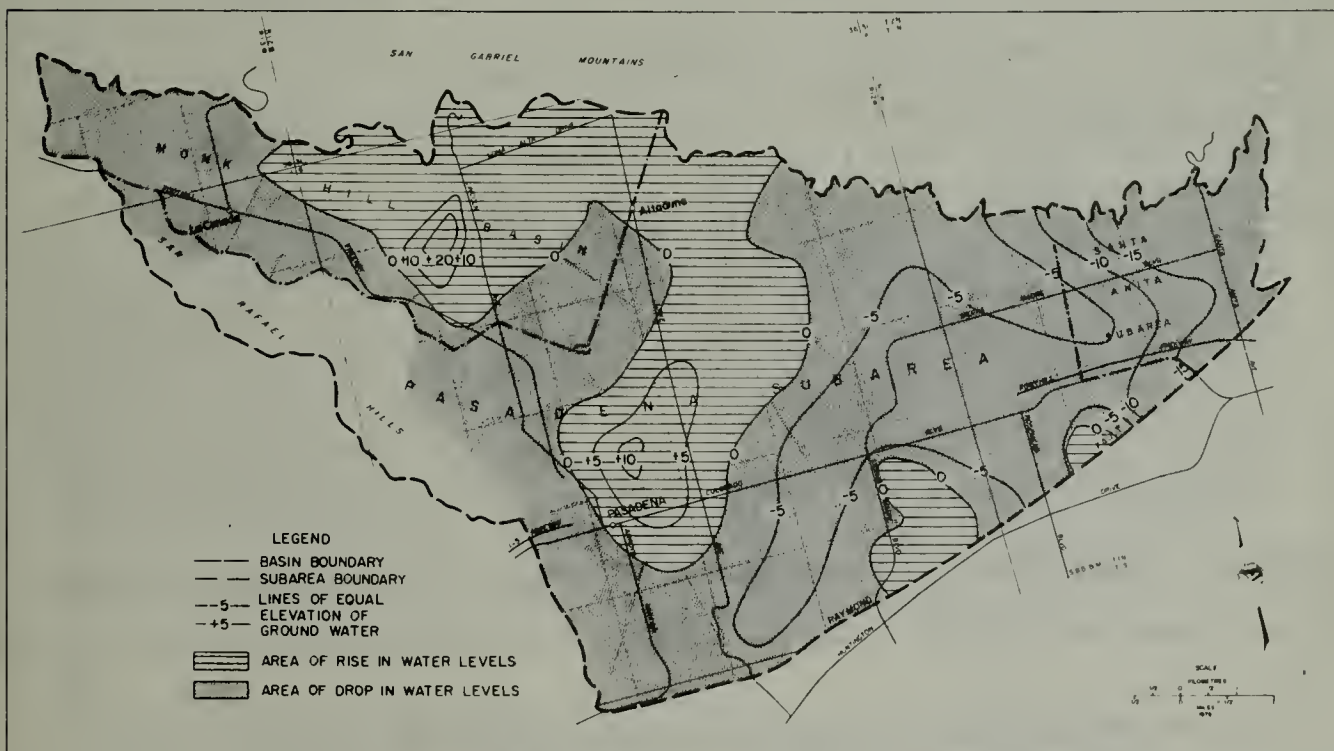
Figure 5. LINES OF EQUAL ELEVATION OF GROUND WATER, FALL 1975





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Figure 6. LINES OF EQUAL ELEVATION OF GROUND WATER, SPRING 1976



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Figure 7. LINES OF EQUAL CHANGE OF GROUND WATER ELEVATION, FALL 1974 TO FALL 1975

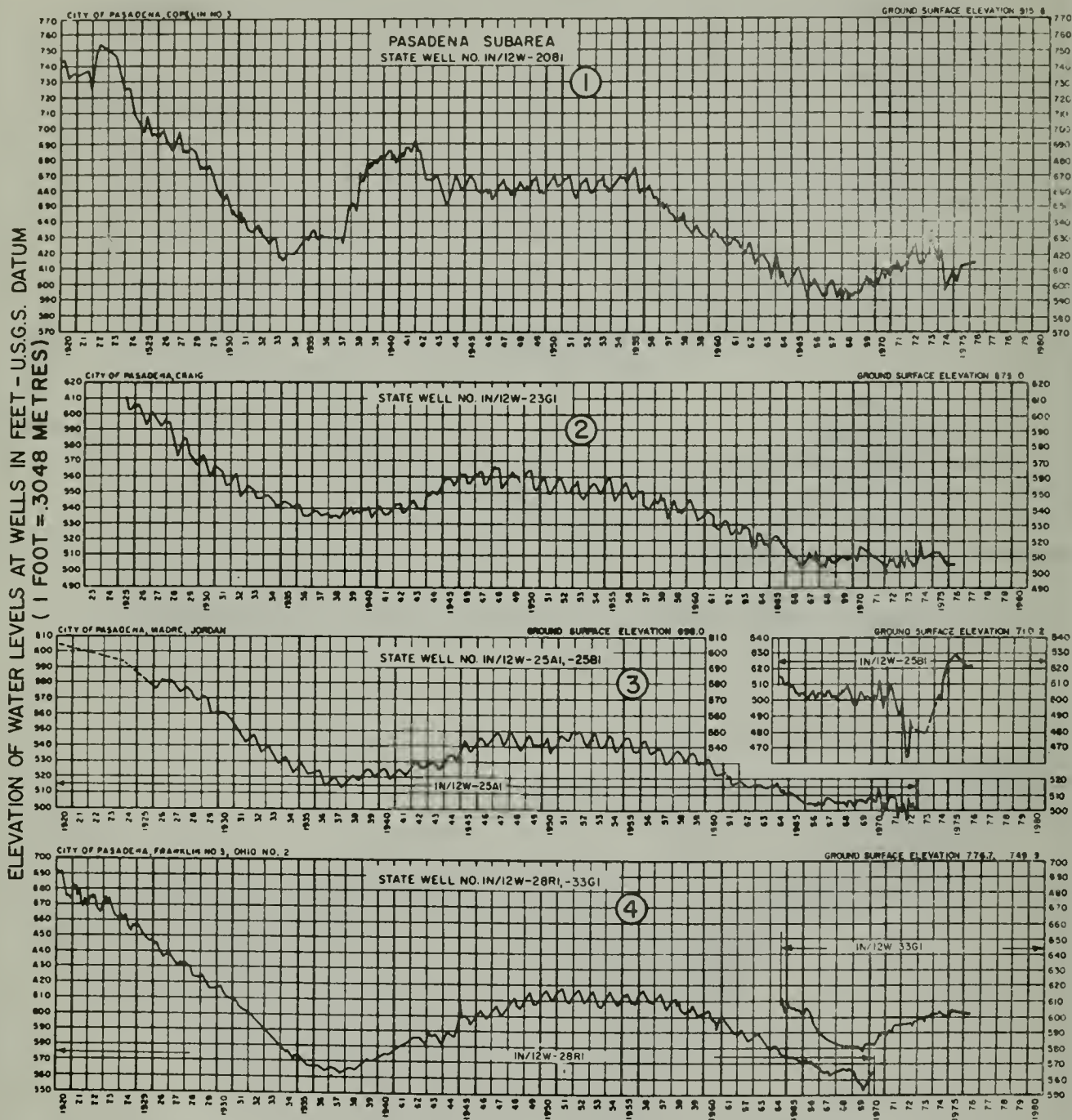


Figure 8 - FLUCTUATION OF WATER LEVELS AT WELLS IN THE PASADENA SUBAREA

(Please refer to Figure 11, Index to Hydrographs, on page 20 for locations of wells shown in Figures 8, 9, and 10.)

ELEVATION OF WATER LEVELS AT WELLS IN FEET-USGS. DATUM
(1 FOOT = .3048 METRES)

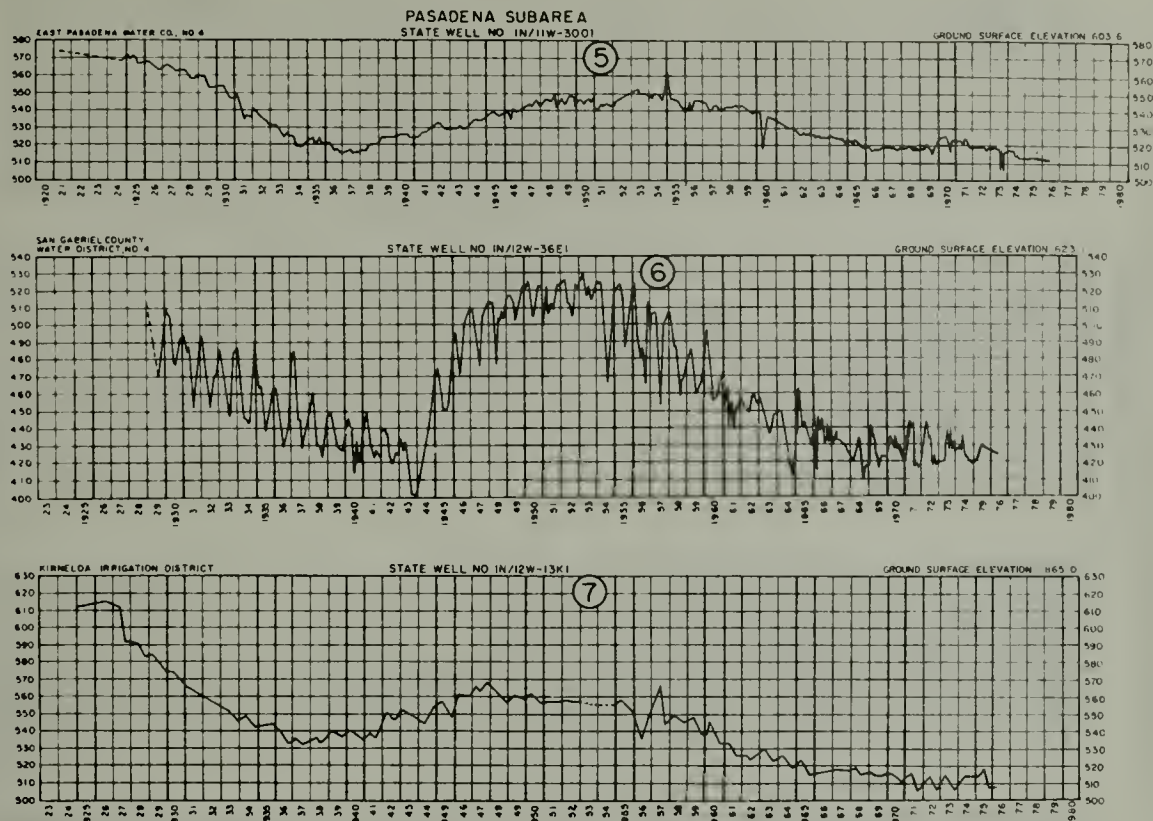


FIGURE 8 (Continued)

ELEVATION OF WATER LEVELS IN FEET-USGS. DATUM
(1 FOOT = .3048 METRES)

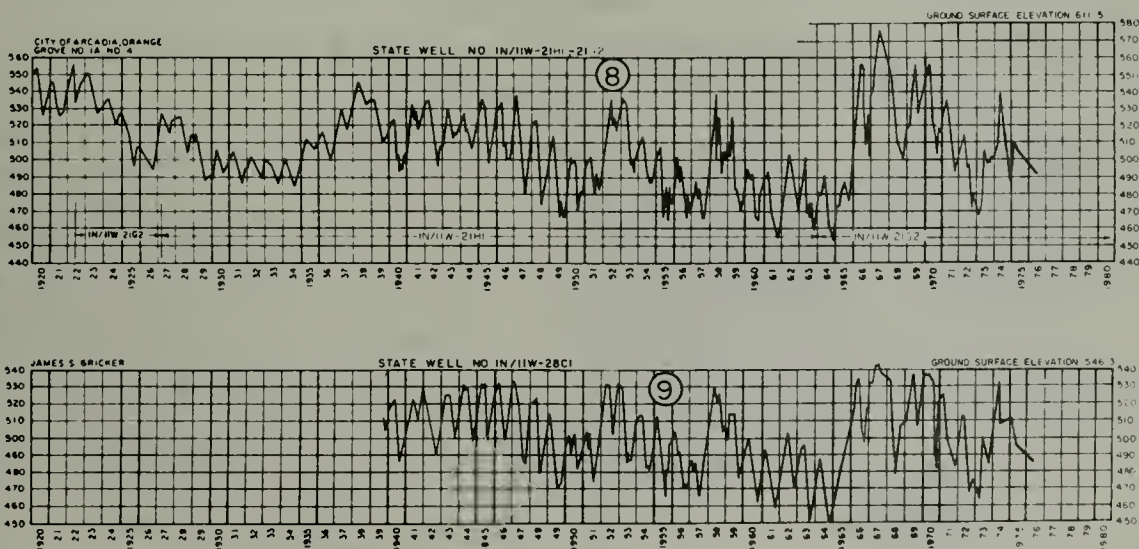


Figure 9 - FLUCTUATION OF WATER LEVELS AT WELLS IN THE SANTA ANITA SUBAREA

ELEVATION OF WATER LEVELS AT WELLS IN FEET - U.S.G.S. DATUM
(1 FOOT = .3048 METRES)

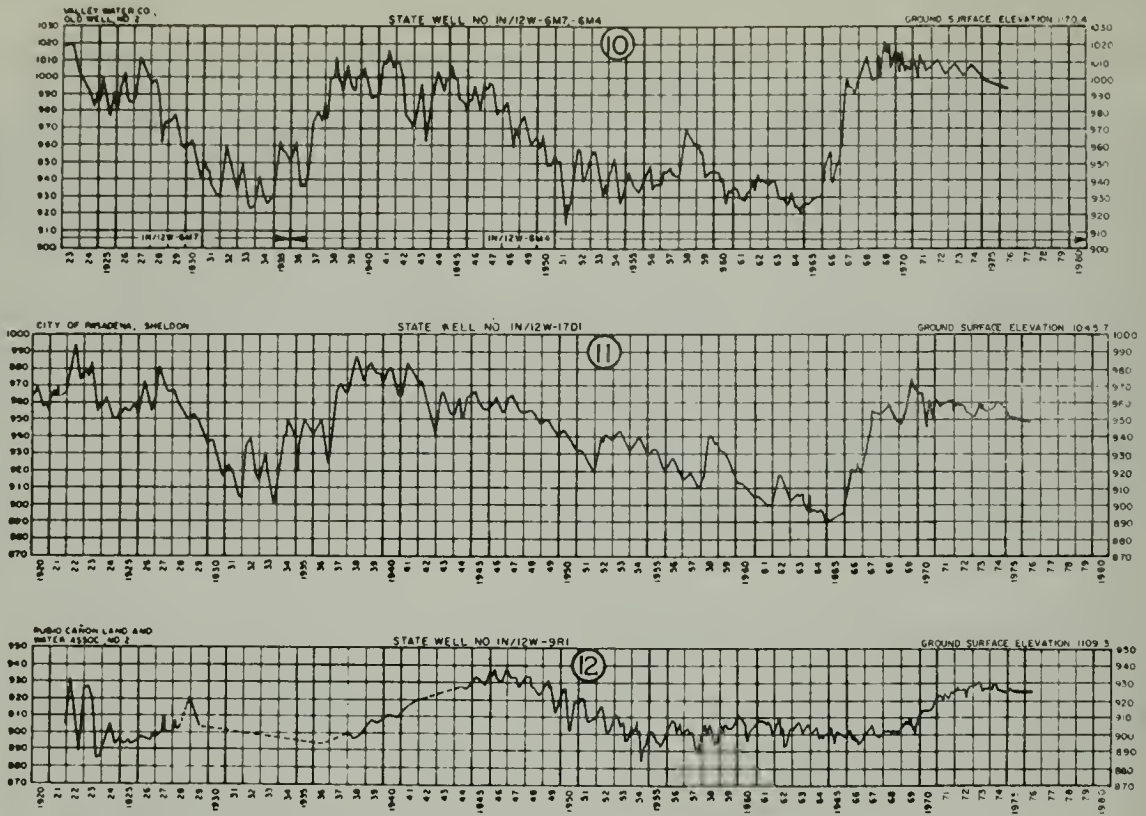
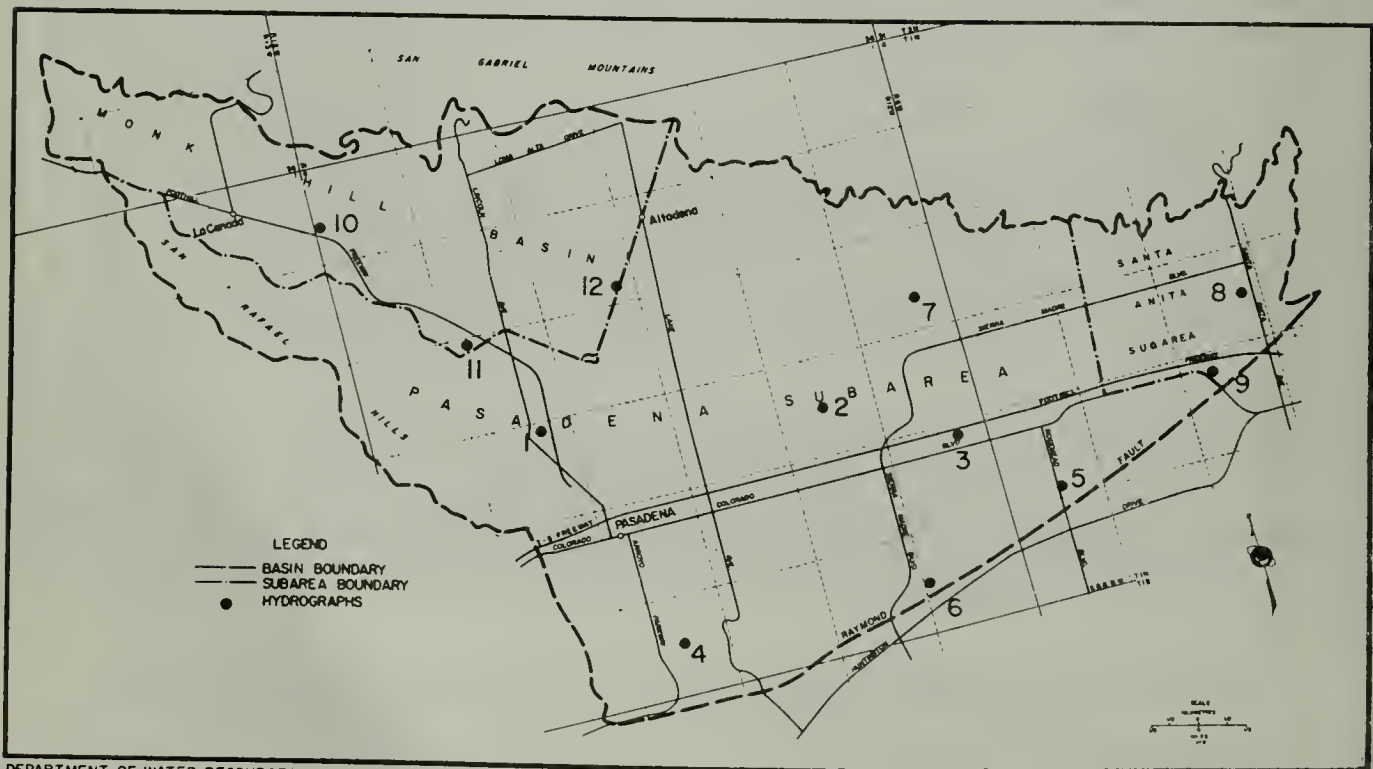


Figure 10- FLUCTUATION OF WATER LEVELS AT WELLS IN THE MONK HILL BASIN



DEPARTMENT OF WATER RESOURCES, SOUTHERN DIVISION, 1976

Figure 11. INDEX TO HYDROGRAPHS

Water Well Numbering in the Raymond Basin

Each well in the Raymond Basin can be located by its State Well Number, a numbering system based on the U. S. Public Land Survey. Each number consists of township, range, and section number; a letter to identify the 16.88-hectare (40-acre) tract in which the well is located; a sequence number to show the chronologic order in which the well was identified; and a letter to represent the base and meridian. The letter "S" is sometimes omitted because all wells in the Raymond Basin are situated in relation to the San Bernardino base and meridian. The parts of State Well Number IN/12W-25Q01S are illustrated in Figure 12.

During fiscal year 1975-76, the Watermaster field checked all wells in the Basin. There were 131 wells, 65 active, including 3 owned by 2 non-parties (Figure 13).

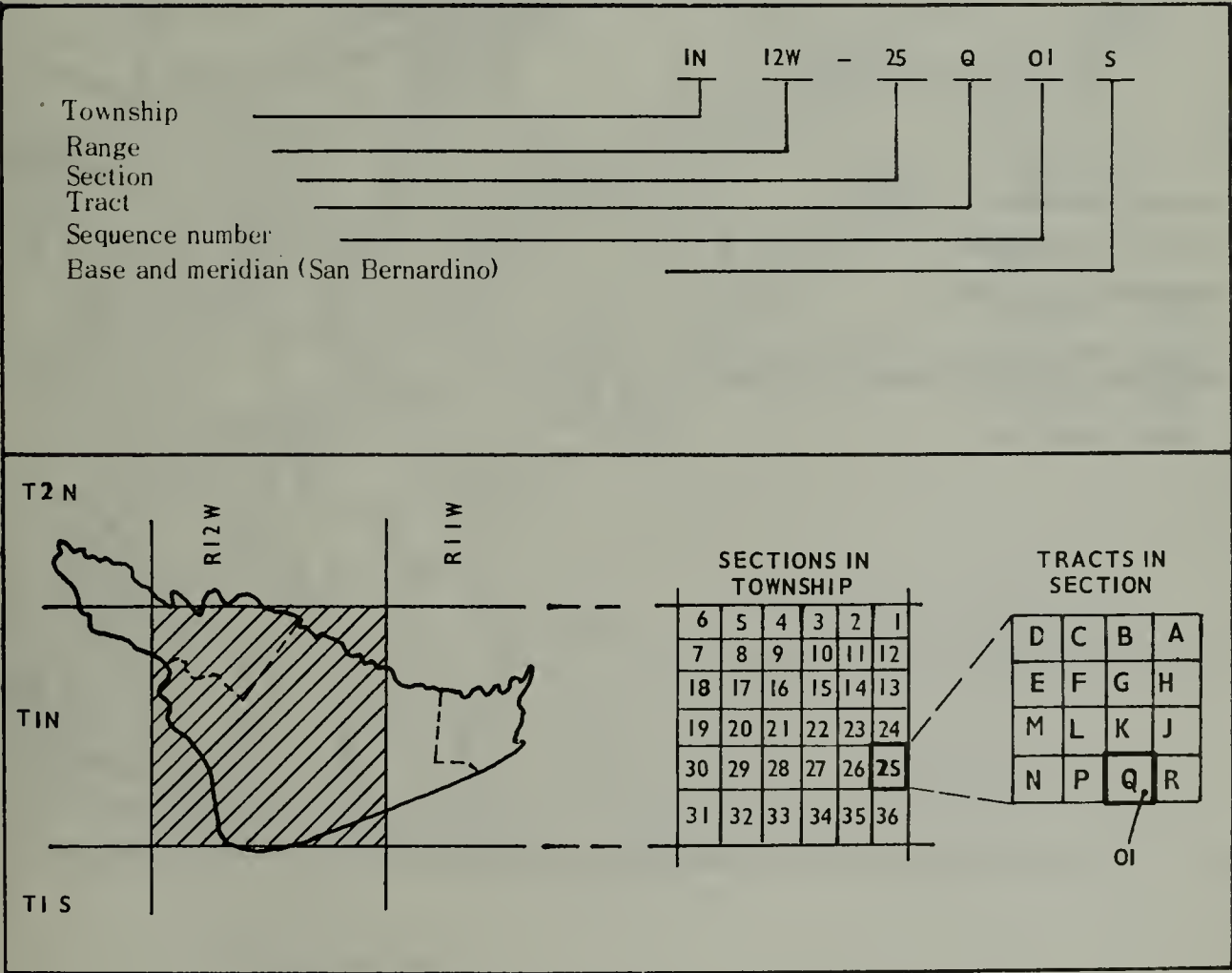


Figure 12. LOCATING STATE WELL NO. IN/12W-25Q01S

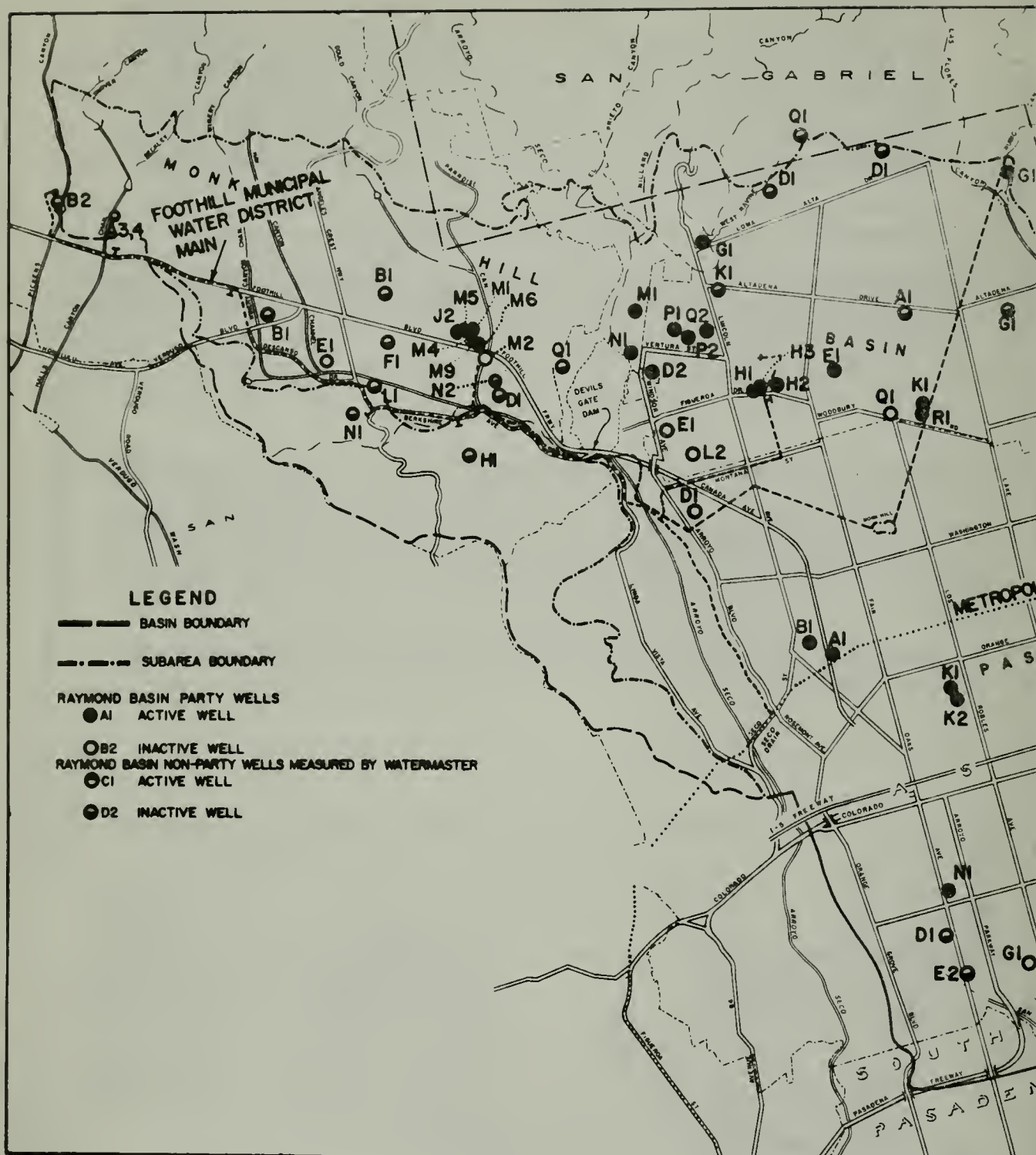
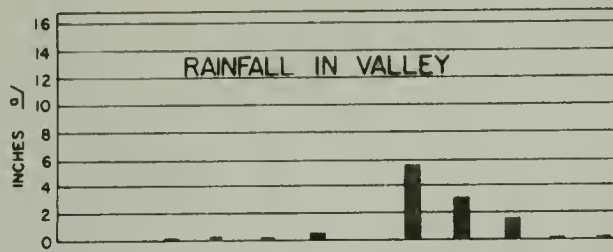


Figure 13.

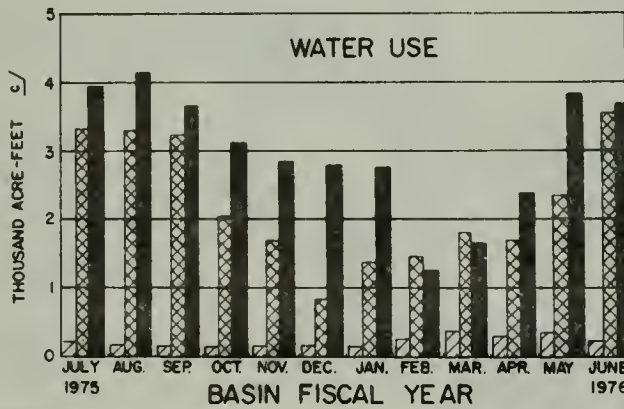
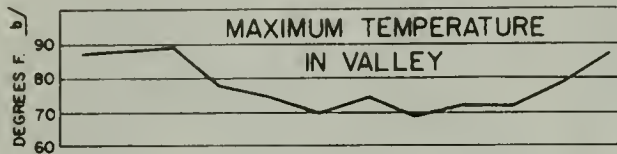


METRIC CONVERSIONS

a/ 1 Inch = 25.4 Millimetres

b/ $\frac{\text{Degree Fahrenheit} - 32}{1.8} = \text{Degree Celsius}$

c/ 1,000 Acre-Feet = 1,233 Cubic Hectometres



LEGEND

TOTAL GROUND WATER EXTRACTATIONS
IMPORTED WATER
SURFACE AND TUNNEL WATER DIVERSIONS

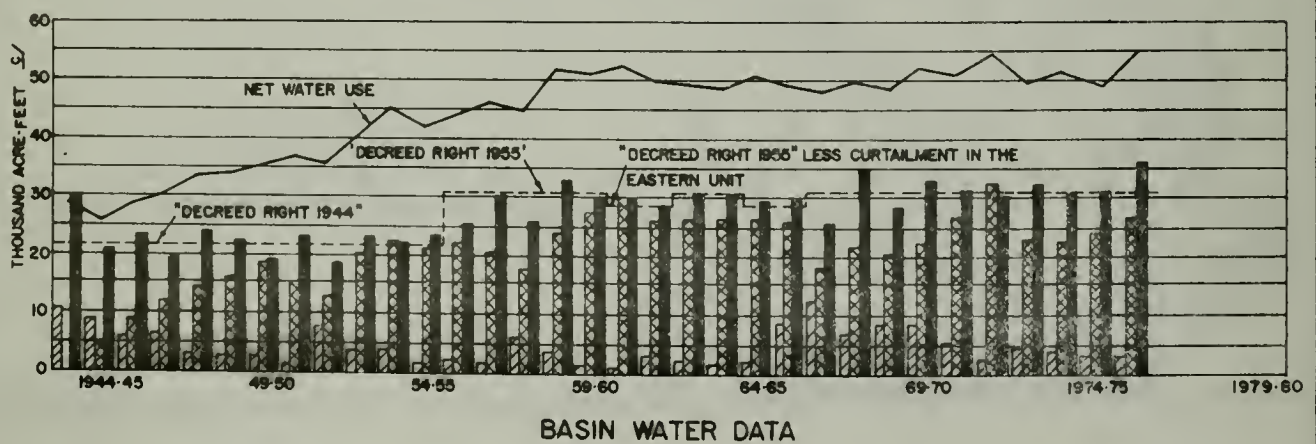


Figure 14. CLIMATIC CONDITIONS AND WATER USE

3. WATER USE

Net water use is the sum of ground water extractions, salvage water extractions (City of Sierra Madre), surface water diversions tributary to the Raymond Basin, and water imported to the Basin, minus the exports from the Basin. Water diverted for spreading is not included in net water use computations (Table 6).

Rapid population growth between 1944 and 1958 caused a substantial increase in net water use by parties. Despite greater population, use of local ground water has been held to the Decreed Rights since 1944. Population growth has leveled off since 1959.

Most of the increased water requirements have been met by Colorado River water imports. Historic water use and the correlation between current climatic conditions and monthly water use are shown in Figure 14. Rainfall values are based on valley station records and temperature values are based on the average temperatures in the Cities of Pasadena and Sierra Madre (Table 2).

The bar graphs in Figure 14 strongly indicate that climate is one of the most important phenomena that affect water use. For example, as rainfall increases and temperatures drop, water requirements decline.

Ground Water Extractions

The Raymond Basin Judgment limits the amount of ground water that each party can extract annually from the Basin or can release to the Water Exchange Pool for pumping by other parties. Recipients of exchange water may pump the amount released to them in addition to their "Decreed Right 1955".

The metered ground water production from each active well in the Basin is listed by party in Appendix B, which also shows the total production reported by each party.

The gross water supply includes all sources of water necessary to supply each party's total water requirement. A report on the gross water supply of all parties appears in Table 7. Several parties who extracted ground water from the basin adjacent to the Raymond Basin are also shown in Table 7.

Surface Water Diversion

The Judgment allows certain parties to divert surface water tributary to the Raymond Basin. Parties also divert and import nontributary surface water. Two types of diversions are used: surface and tunnel. Surface diversions collect surface water, such as streams or springs. Tunnel diversions collect subsurface water in either horizontal or vertical galleries. The water is diverted to a reservoir, treatment plant, service facility, or spreading ground (Table 7).

Use of Imported Water

Colorado River water was first available to the City of Pasadena in June 1941. However, the City did not begin to use it continuously until June

1945. The amount imported during 1975-76 by each party connected with the Foothill Municipal Water District (FMWD) and by the City of Pasadena is shown in Table 7. In May 1975, FMWD began importing higher quality State Project water. This water is blended with Colorado River water.

Ground Water Exports

The Watermaster calculates that parties with service areas both inside and outside the Basin export ground water only if their water sales in the Basin are less than the sum of water pumped, diverted, and purchased in the Basin. Since the City of Pasadena's supply comes from several

Table 6. DECREED RIGHT AND AMOUNT OF WATER EXTRACTED AND EXCHANGED
In acre-feet (1 acre-foot = 1 233 cubic metres)

Party	(1) "Decreed Right, 1955"	(2) Allowable carryover from 1974-75	(3) Spreading credit ^{e/}	(4) Net leases ^{b/}	(5) Allowable extraction (1)+(2)+(3)+(4)	(6) Amount extracted	(7) Balance (5)-(6)	(8) Allowable carryover into 1976-77 ^{c/}
WESTERN UNIT								
<u>Monk Hill Basin</u>								
La Canada Irrigation District	100.00	60.48 ^{d/}			160.48	168.26	- 7.78	-7.78
Las Flores Water Co.	249.00	0.00	34.12		283.12	281.70	1.42	1.42 ^{e/}
Lincoln Avenue Water Company	567.00	0.00	425.99		992.99	1,184.92	-191.93	-191.93
Pasadena Cemetery Assoc.	91.00	6.85			97.85	83.00	14.85	9.10
Pasadena, City of	4,464.00	0.00	234.82		4,698.82	4,508.93	189.89	189.89 ^{e/}
Rubio Canon Land and Water Assoc.	1,221.00	117.31	194.58		1,532.89	1,355.61	177.28	177.28 ^{f/}
Valley Water Company	<u>797.00</u>	<u>27.45</u>			<u>824.45</u>	<u>815.99</u>	<u>8.46</u>	<u>8.46</u>
Subtotals	7,489.00	212.09	889.51		8,590.60	8,398.41	192.19	186.44
<u>Pasadena Subarea</u>								
Alhambra, City of	1,031.00	323.50 ^{d/}		- 300.00	1,054.50	1,054.11	0.39	0.39
Arcadia, City of	1,167.00	7.91			1,174.91	1,142.94	31.97	31.97
California-American Water Co.	2,299.00	229.90		+ 300.00	2,828.90	2,900.83	- 71.93	- 71.93
East Pasadena Water Co.	515.00	213.64 ^{d/}		- 150.00	578.64	623.28	- 44.64	- 44.64
H. E. Huntington Library and Art Gallery	262.00	- 72.19 ^{h/}		+ 200.00 ^{i/}	389.81	409.84	- 20.03	- 20.03
Kinneloa Irrigation Dist.	466.00 ^{k/}	523.40 ^{h/}	3.54	- 650.00 ^{j/}	342.94	375.79	- 32.85	- 32.85
Monrovia, City of	951.00	89.66			1,040.66	937.81	102.85	95.10
Pasadena, City of	8,343.00	932.61	1,422.62	+ 600.00 ^{j/}	11,298.23	11,122.88	175.35	175.35 ^{e/}
Royal Laundry & Dry Cleaning	160.00 ^{k/}	3.32			163.32	131.65	31.67	11.00
San Gabriel County Water District	1,091.00	- 0.02			1,090.98	1,090.99	- 0.01	- 0.01
Sunny Slope Water Company	<u>1,558.00</u>	<u>155.80</u>			<u>1,713.80</u>	<u>1,917.19</u>	<u>-203.39</u>	<u>-203.39</u>
Subtotals	17,843.00	2,407.53	1,426.16	0.00	21,676.69	21,707.31	- 30.62	- 59.04
Totals - Western Unit	25,332.00	2,619.62	2,315.67	0.00	30,267.29	30,105.72	161.57	127.40
Recapitulation for City of Pasadena	12,807.00	932.61	1,657.44	+ 600.00	15,997.05	15,631.81	365.24	365.24
EASTERN UNIT								
<u>Santa Anita Subarea</u>								
Arcadie, City of	3,526.00	- 3.55		+ 183.69	3,706.14	3,706.15	- 0.01	- 0.01 ^{j/}
Sierra Madre, City of	<u>1,764.00</u>	<u>0.00</u>	<u>3,659.84^{l/}</u>	<u>- 183.69</u>	<u>5,240.15</u>	<u>2,364.32^{m/}</u>	<u>2,875.83</u>	<u>2,875.83^{j/}</u>
Totals - Eastern Unit	5,290.00	- 3.55	3,659.84	0.00	8,946.29	6,070.47	2,875.82	2,875.82
GRAND TOTALS	30,622.00	2,616.07	5,975.51	0.00	39,213.58	36,176.19	3,037.39	3,003.22

^{a/} Unless noted, pursuant to modification of Judgment dated January 17, 1974, see Tables 4 and 9. Amount includes credit from 1974-75.

^{b/} See Appendix C and Table 10 for information concerning leases.

^{c/} Computation based on the modification of Judgment dated June 24, 1974. Where noted, includes spreading credit (footnote "e").

^{d/} Includes annual carryover credit pursuant to modification of Judgment dated June 24, 1974.

^{e/} Spreading credit. See footnote "a" and Table 13.

^{f/} Includes spreading credit from 1974-75.

^{g/} Decreed Right (516.00 acre-feet) less 50 acre-feet released to the Exchange Pool.

^{h/} Includes annual carryover credit of predecessors in interest pursuant to modification of Judgment dated June 24, 1974.

^{i/} Includes or transfers, wholly or partially, carryover flexibility right.

^{j/} Decreed Right (110.00 acre-feet) plus 50 acre-feet received from Exchange Pool.

^{k/} Salvage credit. See Table 3.

^{l/} Includes 784.01 acre-feet of salvage credit pumped, which is not part of the safe yield.

sources, its total export contains Colorado River water, State Project Water, diverted surface water, and ground water (Table 7).

Nonparty Ground Water Extraction

The Watermaster continues to monitor nonparty ground water extractions. Two nonparty pumpers in the Western Unit continue to extract ground water:

Huntington-Sheraton Hotel
State Well No. 1N/12W-34N1

1 480 cubic metres (1.20 acre-feet)

Las Encinas Hospital
State Well No. 1N/12W-25K1
State Well No. 1N/12W-25L2

51 178 cubic metres (41.49 acre-feet)

The Hotel extractions were estimated by the plant engineer. The Hospital based its water use on water-meter readings.

Exports of Sewage

In the 1967-68 season, to measure sewage outflow, the Watermaster selected key stations on large sewage trunk lines from the Basin across the Raymond Fault and was granted temporary permission to install recorders at each. The next season, he installed F-type water stage

Table 7. GROSS WATER SUPPLY
In acre-feet (1 acre-foot = 1 233 cubic metres)

Party	Total ground water extractions		Total surface water diversions		Total water		Net water use within the basin
	Inside basin	Outside basin ^{a/}	Tributary to Raymond Basin ^{b/}	Nontributary to Raymond Basin ^{a/}	Imported ^{c/}	Exported	
Alhambra, City of	1,054.11	(10,966.19)					1,054.11
Arcadia, City of	4,849.09	(10,746.89)			-	621.14	4,227.95
California-American Water Co.	2,900.83	(4,579.74)			-	569.83	2,331.00
East Pasadena Water Company	623.28	(1,398.32)			-	198.61	424.67
H. E. Huntington Library and Art Gallery	409.84						409.84
Kimmeloa Irrigation District	375.79		207.13				582.92
La Canada Irrigation District	168.26			(92.59)	2,232.26	- 310.41	2,090.11
Las Flores Water Company	281.70		59.68		524.11		865.49
Lincoln Avenue Water Company	1,184.92				940.53		2,125.45
Monrovia, City of	937.81	(7,020.83)					937.81
Pasadena Cemetery Association	83.00						83.00
Pasadena, City of	15,631.81		1,856.43		19,654.21	- 6,967.80	30,174.65
Royal Laundry and Dry Cleaning Company	131.65						131.65
Rubio Canon Land and Water Association	1,355.61		86.59		943.89		2,386.09
San Gabriel County Water District	1,090.99	(5,750.80)					1,090.99
Sierra Madre, City of	2,364.32 ^{d/}		362.75 ^{e/}				2,727.07
Sunny Slope Water Company	1,917.19	(2,696.21)				- 1,781.76	135.43
Valley Water Company	815.99				2,319.95		3,135.94
TOTALS	36,176.19		2,572.58		26,614.95	- 10,449.55	54,914.17

^{a/} Used by parties in areas outside the Raymond Basin.

^{b/} Does not include surface diversions for spreading as follows: Kimmeloa Irrigation District: 3.51 acre-feet; Las Flores Water Company: 25.95 acre-feet; Lincoln Avenue Water Company: 392.06 acre-feet; City of Pasadena (Easton Canyon): 979.40 acre-feet; (Arroyo Seco): 84.44 acre-feet; Rubio Canon Land and Water Association: 92.27 acre-feet.

^{c/} Blend of Colorado River water and State Project water.

^{d/} Includes 784 acre-feet of salvage water that was extracted.

^{e/} Does not include 1,030 acre-feet diverted for spreading to recharge ground water.

recorders in 12 trunk lines for one week (Figure 15).

This program was repeated periodically and a trend of increasing outflow has been established. The increase is apparently commensurate with the cultural and population changes in the Basin.

The following yearly outflows were computed: 1968-69 -- 25 065 953 cubic metres (20,321 acre-feet); 1970-71 -- 24 684 802 cubic metres (20,012 acre-feet); and 1972-73 -- 26 584 392 cubic metres (21,552 acre-feet). Historic estimates include: 1938-39 -- 7 277 650 cubic metres (5,900 acre-feet); and 1951-52 -- 11 718 250 cubic metres (9,500 acre-feet).

Flow at Key Stations (1972-73)

<u>Map Code</u>	<u>Station</u>	<u>Cubic Metres</u>	<u>Acre-feet</u>
1	Grand Avenue	3 014 670	2,444
2	Garfield Avenue	1 470 330	1,192
3	Los Robles Avenue	2 545 940	2,064
4	Old Mill Road	94 970	77
5	Virginia Road	1 995 800	1,618
6	San Marino Avenue	4 507 200	3,654
7	Sierra Madre Blvd.	261 500	212
8	N. Gainsborough St.	5 489 070	4,450
9	Sunset Blvd.	4 779 810	3,875
10	Old Ranch Road	263 960	214
11	Colorado Place	735 160	596
12	Colorado Blvd. at First Street	1 425 920	1,156
TOTAL		26 547 380	21,552



DEPARTMENT OF WATER RESOURCES, SOUTHERN DIVISION, 1978

Figure 15. SEWAGE-GAGING STATIONS

Water Quality

Quality is an important factor in water supply: The water must be fit for beneficial uses. Quantity and quality are interrelated variables that must be considered in water resources management. Water quality is a result of, and depends on, both natural and man-made phenomena.

The Basin's water need is supplied from local ground water, tunnel water, diverted surface water, imported Colorado River water, and State Project water. This supply is of excellent quality and meets all standards for beneficial uses (Table 8).

Ground Water

The quality of the Basin's ground water is generally within the recommended limits set by the U. S. Public Health Service (USPHS) for drinking water standards. Except for a few wells whose fluoride concentration is above 1.0 mg/l, it is of good mineral quality and suitable for most beneficial uses. The chemical character is largely calcium bicarbonate and ranges from soft to hard.

Tunnel Water

Several parties in the Basin use abandoned mines and tunnels for collecting seepage from mountain crevices. The chemical character of the water is similar to ground water (calcium bicarbonate) and ranges from soft to hard.

Table 8. REPRESENTATIVE MINERAL ANALYSIS OF WATER

Well number or source	Date sampled	ECx10 ⁶ at 25°C	pH	Mineral constituents in											Total dissolved solids in mg/l	Total hardness as CaCO ₃ in mg/l	
				Milligrams per liter (mg/l)													
				Milli-equivalents per liter (me/l)													
Ca	Mg	Na	K	CO ₃	HCO ₃	SO ₄	Cl	NO ₃	F	B							
<u>IMPORTED WATER</u>																	
State Project Water - Colorado River Water (50-50 Blend) at Pasadena Sunset Intake	8-18-75	815	8.2	$\frac{55}{2.74}$	$\frac{20}{1.64}$	$\frac{79}{3.44}$	$\frac{4.2}{0.11}$	-	$\frac{130}{2.13}$	$\frac{170}{3.54}$	$\frac{64}{1.8}$	$\frac{1.1}{0.02}$	$\frac{0.4}{0.02}$	-	502	220	
<u>SURFACE WATER</u>																	
Arroyo Seco at John L. Behner Treatment Plant (raw)	8-5-75	475	8.0	$\frac{51}{2.55}$	$\frac{13}{1.07}$	$\frac{23}{1.00}$	$\frac{3}{0.08}$	-	$\frac{220}{3.61}$	$\frac{29}{0.60}$	$\frac{10}{0.28}$	$\frac{3}{0.05}$	$\frac{1.1}{0.06}$	-	294	182	
<u>TUNNEL WATER</u>																	
City of Sierra Madre East Tunnel	4-1-76	350	8.2	$\frac{42}{2.09}$	$\frac{11.1}{0.91}$	$\frac{16}{0.70}$	$\frac{1.9}{0.05}$	-	$\frac{163}{2.68}$	$\frac{24}{0.50}$	$\frac{11}{0.30}$	$\frac{10.6}{0.17}$	$\frac{2.1}{0.11}$	-	219	150	
<u>GROUND WATER</u>																	
<u>Monk Hill Basio</u>																	
1M/12W-08H02 (Las Flores No. 2)	8-1-75	417	7.4	$\frac{45}{2.24}$	$\frac{13}{1.04}$	$\frac{20}{0.86}$	$\frac{1.4}{0.04}$	-	$\frac{140}{2.30}$	$\frac{29}{0.61}$	$\frac{26}{0.73}$	$\frac{44}{0.71}$	-	-	259	164	
<u>Pasadena Subarea</u>																	
1M/11W-30R03 (Hugo Reid Well)	9-30-75	470	7.6	$\frac{45}{2.25}$	$\frac{10.5}{0.86}$	$\frac{34.5}{1.50}$	$\frac{1.3}{0.03}$	-	$\frac{171}{2.80}$	$\frac{45}{0.94}$	$\frac{27.5}{0.78}$	$\frac{24.5}{0.40}$	$\frac{1.09}{0.06}$	-	285	156	
1M/12W-21K01 (Pasadena Garfield Well)	8-5-75	327	7.8	$\frac{29}{1.46}$	$\frac{7.3}{0.60}$	$\frac{26}{1.13}$	$\frac{1.6}{0.04}$	-	$\frac{108}{1.77}$	$\frac{32}{0.66}$	$\frac{18}{0.50}$	$\frac{27}{0.43}$	-	-	188	103	
<u>Santa Anita Subarea</u>																	
1M/11W-21K05 (Orange Grove No. 5)	11-3-75	420	7.9	$\frac{24}{1.20}$	$\frac{2}{0.16}$	$\frac{69}{3.00}$	$\frac{1.1}{0.03}$	-	$\frac{171}{2.80}$	$\frac{18.5}{0.39}$	$\frac{25}{0.71}$	$\frac{7.2}{0.12}$	$\frac{1.09}{0.06}$	-	252	68	

Surface Water

Surface water, though its direct use is restricted due to the increased use of the watershed by recreationists, still constitutes an important part of the Basin's supply. Its chemical character is calcium bicarbonate and is moderately hard to hard.

Imported Water

The two main sources of imported water are from the Colorado River and the State Water Project. Since 1941, most of the water imported into the basin has been Colorado River water. Samples taken between 1953 and 1974 at the City of Pasadena's Sunset turnout indicate a TDS high of 904 mg/l in January 1957 and a low of 596 mg/l in October 1953. The average TDS concentration for the period is approximately 741 mg/l.

State water delivered to the San Fernando Basin since May 1972 has averaged 331 mg/l TDS and 164 mg/l in total hardness. Beginning in May 1975, the City of Pasadena and the Foothill Municipal Water District began a program of delivering to purveyors a 50-50 blend of Colorado River water and State Project waters. A sample of this blended water taken in August 1975 at Pasadena's Sunset Intake showed a TDS concentration of 502 mg/l (Table 8). Pasadena and Foothill Municipal Water District will continue to provide the 50-50 blend to the basin except during periods when normal project operations must be altered.

Areawide Water Quality Monitoring

In compliance with the Beilenson Health Act, the State Department of Health (SDH) on November 26, 1973, requested the Raymond Basin Advisory Board to formulate an areawide water quality monitoring program. On May 10, 1974, the Board authorized the Watermaster to prepare the program. In June, a draft was sent to SDH and the Board for review. The following month, SDH approved the program, and the Board accepted it at its December meeting.

Title 17, Part 1, Chapter 5 of the California Administrative Code defines the limits of concentration acceptable for domestic use. The monitoring program requires sampling all domestic water sources for mineral and physical constituents every five years; however, Colorado River water conveyed through MWD's facilities is excepted from this requirement. Sources from selected key locations will also have to be sampled and tested every five years for trace elements, pollutants, pesticides, and herbicides. These key stations include five wells, two tunnels, and the three major tributary streams in the Basin.

Results of analyses obtained by the participants will be submitted to SDH through the Watermaster.

The monitoring program does not include analysis for radioactivity, carbon chloroform extract, and carbon alcohol extract. SDH will monitor such constituents in individual service areas on an as-required, case-by-case basis. Bacteriological monitoring of individual distribution systems are to be made by the individual water purveyors to comply with Part 1, Chapter 5, Article 3 of Title 17, of the California Administrative Code. Analysis of imported water will be made by MWD.

The results of the monitoring program for fiscal year 1975-76 were reported in the DWR District Report "Results of Areawide Water Quality Monitoring Program for the Raymond Basin". This report was mailed to the SDH, LACFCD, Raymond Basin Advisory Board and water purveyors in the Raymond Basin. In summary, it reports that water quality in the basin is of excellent quality in regard to all constituents tested except a few sources with high fluoride concentrations. Efforts are being made to eliminate these high concentrations.

Land Use Study, 1973

A land use inventory of Coastal Los Angeles County, including the Raymond Basin, was conducted by DWR and was reported in the District Report "Coastal Los Angeles County Land-Use Study, 1973". The study, based on January and February 1973 aerial photography, was conducted from August 1973 to September 1974.

Water use is intimately associated with land use. Results from this study are extremely valuable to water planners. Detailed land use tabulations and the District Report are available for inspection in the Southern Division office.



4. ADMINISTRATION OF THE JUDGMENT

The Raymond Basin Advisory Board, created by the Los Angeles County Superior Court, assists and advises the Watermaster on matters of policy and budgets.

To manage the Basin effectively, the Board initiated a cooperative water resources management study during fiscal year 1967-68. Begun under a March 21, 1968 agreement between DWR and the City of Pasadena representing all parties, the program's objective is the design of a mathematical model of the Basin to simulate the dynamic behavior to a ground water basin and surface water facilities under various operational plans. The Basin was divided into 79 subzones so that the ground water level information gained would be sufficiently detailed for long-range planning.

Before projections could be made, the model's accuracy had to be verified against historic hydraulic data. Numerous alternative plans for using ground and surface water together were then imposed on the model. With the data thus obtained, a wide range of operational and economic information is being gathered for management planning. The analysis was completed during the 1970-71 fiscal year and the findings of the investigation were published as DWR Bulletin No. 104-6, "Meeting Water Demands in the Raymond Basin Area", June 1971.

Court Actions

During the 1973-74 fiscal year, two modifications of the Raymond Basin Judgment were approved. The first, on January 17, 1974, adjudicates a plan for spreading and recapturing surface water diversions. The second, on June 24, 1974, incorporates the following elements: (1) a statement of the manner of disposal of accumulated carryover by specified parties in the Western Unit of the Basin; (2) a modification in the flexibility provisions for allowable pumping; (3) a program for the voluntary control of pumping patterns in the Monk Hill Basin, Pasadena Subarea, and Eastern Unit; (4) a confirmation of the transfers and ownership of water rights; (5) the establishment of a water quality monitoring program for the Raymond Basin.

These modifications result from studies and agreements between the Watermaster, the Raymond Basin Advisory Board, and the parties to the Judgment. They are designed to respond to changing conditions in the Basin, incorporate refinements based on accumulated experience, and establish improved control techniques.

Metered Surface Diversions for Spreading

A special study, "Spreading Surface Water in the Raymond Basin Area", was completed by DWR in January 1973, using the mathematical model described earlier. The Advisory Board subsequently accepted the recommendations of the study and a program of spreading and recapturing surface water diversions was begun on May 1, 1973.

A "Motion to Modify Judgment to Allow Spreading and Recapturing by Pumping of Certain Surface Water Diversions" was prepared and presented to the Court for a hearing on November 9, 1973. No objections to the motion were made and the Judgment was modified and signed on January 17, 1974.

The modification includes a clause which allows the program to be effective retroactively to May 1, 1973. The Kinneloa Irrigation District and the City of Pasadena began their metered diversions for spreading on May 1, 1973; the Lincoln Avenue Water Company and Rubio Canon Land and Water Association, on June 1, 1973; and Las Flores Water Company, on January 3, 1974. Each of the surface diversion facilities and metering devices has been inspected and approved by the Watermaster. The facilities will be inspected periodically to certify their proper operation.

In accordance with the Modification of the Judgment, the Watermaster will determine the amount of water diverted for spreading and LACFCD will certify the amount spread. Parties will be allowed to extract 80 percent of the amount spread and certified. A summary of the amounts spread and certified during fiscal year 1975-76, together with the amounts available for recapture and amounts recaptured is shown in Table 9. This table (Table 8 in 1974-75 Report) was revised to provide a clearer accounting of unused spreading credit. It also corrects accounting errors which occurred in last year's report, about which the parties were notified. Figures shown are in accordance with accounting procedures provided by the Judgment and are incorporated into Table 6 and their certification shown in Appendix D.

Carryover of the Decreed Right

The Judgment prohibited annual extractions from the Raymond Basin exceeding 120 percent of the "Decreed Right 1955", plus or minus exchange water.

Table 9. SUMMARY OF CREDIT FOR SPREADING DIVERSIONS OF SURFACE WATER
In acre-feet

Party	Unused spreading credit from 1974-75 ^{b/} (1)	Extracted in 1975-76 ^{c/} (2)	1975-76 Spreading Operation				
			Diverted (3)	Spread ^{d/} (4)	Credit 80% ^x (4) (5)	Extracted (6)	Unused Spreading Credit 5-6 (7)
Kinneloa Irrigation District	0.73	0.73	3.51	3.51	2.81	2.81	0.00
Las Flores Water Company	13.36	13.36	25.95	25.95	20.76	19.34	1.42
Lincoln Avenue Water Company	113.21	113.21	392.06	390.97	312.78	312.78	0.00
Pasadena, City of Monk Hill Basin	167.36	167.36	84.44	84.33	67.46	0.00	67.46
Pasadena Subarea	639.10	639.10	979.40	979.40	783.52	608.17	175.35
Rubio Canon Land and Water Association	<u>120.76</u>	<u>120.76</u>	<u>92.27</u>	<u>92.27</u>	<u>73.82</u>	<u>0.00</u>	<u>73.82</u>
TOTAL	1,054.52	1,054.52	1,577.63	1,576.43	1,261.15	943.10	318.05

a/ 1 acre-foot = 1 233 cubic metres.

b/ Revised from 1974-75 Watermaster report.

c/ Pursuant to Item 5 of the Modification of Judgment dated January 17, 1974.

d/ See Appendix D.

It also provided that the total amount pumped or taken by any party in any 60 consecutive months could not exceed the amount released to it by the Exchange Agreement and five times the Party's Decreed Right.

There has been substantial agreement that this accounting procedure is difficult to manage and causes occasional misunderstanding of the manner in which allowed pumping rights could be carried over from one accounting year to the next.

Meetings were held between the Watermaster, Advisory Board, and interested parties at which new carryover and accounting procedures were adopted as part of a motion to modify the Judgment. The motion was heard by the Court on June 24, 1974. No objections were filed, so motion was granted and the Modification of the Judgment was entered on June 24, 1974. It states: "... a party may exceed its Decreed Right to the extent that it has acquired ... the Decreed Right of any other party or as may become necessary in the case of emergency or for other reasonable cause as determined by the Watermaster ... parties to this action may take in any twelve-month period beginning July 1, ... an amount not exceeding one hundred ten percent (110%) of its Decreed Right ... plus any amount of allowable underpumping ... If a party in any twelve-month period, beginning July 1, takes less than its Decreed Right, or less than the amount allowed after reduction for any excess extractions, the amount of such underpumping, but not exceeding ten percent (10%) of its Decreed Right, may be carried over and taken during the next succeeding year."

Those provisions became effective in the 1974-75 fiscal year.

The Modification of Judgment also provides for the manner of disposal of the accumulated carryover by specified parties in the Western Unit. These parties may withdraw the amounts shown below each year for the next five years, commencing in the 1973-74 fiscal year.

These amounts shall be in addition to their Decreed Rights.

<u>Name of Party</u>	<u>Annual carryover credit, in cubic metres (acre-feet)</u>
Alhambra, City of	321 203 (260.4)
East Pasadena Water Co.	213 889 (173.4)
Kinneloa Irrigation District	645 614 (523.4) ^{a/}
La Canada Irrigation District	71 050 (57.6)

^{a/}Includes annual carryover credit of Mira Loma Mutual Water Co., Osborn Co., and Canyon Mutual Water Co. of 130 751 cubic metres (106.0 acre-feet), 68 829 cubic metres (55.8 acre-feet), and 164 056 cubic metres (133.0 acre-feet), respectively.

Pumping Patterns

To prepare the "Report on the Control of Ground Water Levels in the Raymond Basin by Means of Adjusting Pumping Patterns," the Raymond Basin Advisory Board organized a committee whose membership includes the Watermaster, the City of Pasadena, and the parties to the Judgment.

Based on recommendations in the Report, Paragraph 5 of the Modification of Judgment requires the Watermaster to study pumping patterns in the Basin and report his recommendations to the Advisory Board not less than twice each year. The recommendations will recognize the right of each party to pump its Decreed Right, but is advisory only. The success of the program is dependent on the voluntary cooperation of the parties to the Judgment.

On April 1, 1976 the second of these semiannual reports was mailed to all parties in the Raymond Basin. In summary, the report recommended the same or less pumping in all areas. The period for this net reduction in pumping would be during the third and fourth quarters of the 1975-76 fiscal year and would be made relative to the pumping which occurred during the same period of the 1974-75 fiscal year.

Exchange Pool

The Exchange Water Agreement, authorized by the Court, permits the exchange and use of water rights among all parties to the agreement. Participation in the Exchange Agreement is open to all parties to the agreement.

The Exchange Agreement was useful during the early years subsequent to the Court's Judgment when only Pasadena had access to Colorado River water. However, at present six parties use Colorado River water and fewer water rights need be exchanged. The history of Exchange Pool transactions appears in Table 10.

Table 10. EXCHANGE WATER POOL TRANSACTIONS
In acre-feet (1 acre-foot = 1 233 cubic metres)

Season	Quantity of water purchased, in acre-feet				Average cost, per acre-foot	
	Western Unit		Eastern Unit		Western Unit	Eastern Unit
	Monk Hill Basin	Pasadena Subarea	Santa Anita Subarea	Raymond Basin Area		
1944-45	925	53	0	978	\$ 29.88	
45-46	550	82	600	1,232	17.49	4.00
46-47	2,750	64	300	3,114	29.39	4.00
47-48	3,150	142	0	3,292	29.88	
48-49	5,150	115	0	5,265	32.16	
49-50	3,782	160	300	4,242	34.77	15.00
1950-51	3,938	96	700	4,734	31.82	15.00
51-52	3,929	100	0	4,029	35.55	15.00
52-53	3,929	72	0	4,001	31.62	
53-54	3,929	67	0	3,996	35.29	
54-55	3,929	215	0	4,144	34.35	
55-56	2,850	41	0	2,891	34.14	
56-57	1,700	10	0	1,710	27.89	
57-58	1,050	0	0	1,050	26.67	
58-59	0	70	0	70	20.00	
59-60	0	45	0	45	25.00	
1960-61	0	25	0	25	20.00	
61-62	0	40	600	640	18.00	31.00
62-63	0	25	0	25	17.00	
63-64	0	30	0	30	17.00	
64-65	0	35	200	235	17.00	64.55
65-66	0	25	300	325	17.00	37.58
66-67	0	0	0	0		
67-68	0	10	0	10	10.00	
68-69	0	40	0	40	25.00	
69-70	0	50	0	50	25.00	
1970-71	0	40	0	40	25.00	
71-72	0	45	0	45	25.00	
72-73	0	45	0	45	35.00	
73-74	0	45	0	45	35.00	
74-75	0	50	0	50	35.00	
75-76	0	50	0	50	40.00	
TOTALS	41,561	1,887	3,000	46,448		

Since the Judgment was entered in 1944, the Watermaster has mailed an Exchange Pool form to all parties each April, opening the pool to inter-member water right leasing. This year, the Royal Laundry and Dry Cleaning Company leased 61 675 cubic metres (50 acre-feet) for \$40 per 1 233.5 cubic (acre-foot) from the Kinneloa Irrigation District at a cost of \$2000. The \$40 price was the highest on record. This increase in price is typical of increases occurring in other areas and reflects our inflationary economy.

Transfers of Decreed Right

Another method of obtaining additional pumping rights is by lease or sale between parties. Table 11 lists the transactions, parties, and amounts involved for 1975-76.

Samples of our recommended lease and sale agreements are included in the "Watermaster Service in the Raymond Basin - General Information Policies and Procedures", January 1, 1975.

Overextractions

In restricting ground water extractions from the Raymond Basin, it is recognized that there are unavoidable fluctuations in water use from year to year. To allow for this, a flexibility clause is included in the June 1974 Modification of Judgment which allows each party to vary its extractions within stated limits.

Essentially, it permits a party to overextract or underpump as much as 10 percent of its Decreed Right, 1955, with the equivalent debit or credit being applied to its extraction in the subsequent water year.

Table 12 summarizes all overextractions and violations of the Judgment based on the Modification.

The Lincoln Avenue Water Company and Sunny Slope Water Company exceeded the permissible overextraction without the approval of the Watermaster and are in violation of the Judgment. However, they will take steps to eliminate the overextraction and the Watermaster recommends that no action be taken against them.

Allowable Extractions in 1976-77

Table 13 summarizes the allowable extractions for all parties for the 1976-77 water year. It incorporates the carryover as calculated under the method provided by the Modification of Judgment dated June 24, 1974.

Allowable extractions are a part of a dynamic process; the figures shown in Table 13 are those amounts which are correct at the beginning of the water year. Allowable extractions can become larger or smaller in 1976-77, in accordance with as-yet indeterminable factors, i.e., sales, leases, and spreading credit.

Variations from Safe Yield

Table 14 summarizes annual extractions from 1950-51 to the present and compares average annual extractions with safe yield. At present, average annual extractions in each subarea are less than safe yield except in the Monk Hill Basin where it is slightly more. This is due to six years of above-average precipitation during the last 19 years. However, the second lowest precipitation of record during 1971-72 and below average for the period 1969-72, 1973-74 and 1975-76 have increasingly narrowed the gap between extraction and safe yield.

Table 11. TRANSFERS OF DECREEED RIGHT, 1955
In acre-feet^{a/}

Party	Transaction and amount in acre-feet ^{a/}			Party
<u>Pasadena Subarea</u>				
California-American Water Company	Leased	300.00	from	Alhambra, City of
H. E. Huntington Library and Art Gallery	Leased	200.00	from	Kinneloa Irrigation District
Pasadena, City of	Leased	450.00 ^{b/}	from	Kinneloa Irrigation District
Pasadena, City of	Leased	150.00	from	East Pasadena Water Company
<u>Santa Anita Subarea</u>				
Arcadia, City of	Leased	183.69	from	Sierra Madre, City of

a/ 1 acre-foot = 1 233 cubic metres.

b/ Carryover flexibility right on Decreed Right (155.20 acre-feet)
transferred to licensee.

Table 12. OVEREXTRACTIONS
In acre-feet^{a/}

Party	(1) "Decreed Right, 1955"	(2) Allowable carryover from 1974-75	(3) Spreading credit and net leases	(4) Allowable extraction (1)+(2)+(3)	(5) Amount extracted	Overextraction		
	(6) Amount (4)-(5)	(7) Allowable [±] / (10%)(1)	(8) In Percent (6)÷(1)×100					
<u>Monk Hill Basin</u>								
La Canada Irrigation District	100.00	60.48 [£]		160.48	168.26	- 7.78	10.00	7.78
Lincoln Avenue Water Company	567.00	0.00	425.99 ^d	992.99	1,184.92	-191.93 [£]	56.70	33.85
<u>Pasadena Subarea</u>								
California-American Water Company	2,299.00	229.90	+ 300.00 [£]	2,828.90	2,900.83	- 71.93	229.90	3.13
East Pasadena Water Company	515.00	213.64 [£]	- 150.00 [£]	578.64	623.28	- 44.64	51.50	8.67
H. E. Huntington Library and Art Gallery	262.00	- 72.19	+ 200.00 [£]	389.81	409.84	- 20.03	26.20	7.64
Kinneloa Irrigation District	466.00 [£]	523.40 [£]	- 646.46 ^{d,£}	342.94	375.79	- 32.85	51.60 ^h	6.37 ^h
San Gabriel County Water District	1,091.00	- 0.02		1,090.98	1,090.99	- 0.01	109.10	0.00
Sunny Slope Water Company	1,558.00	155.80		1,713.80	1,917.19	-203.39 [£]	155.80	13.05
<u>Santa Anita Subarea</u>								
Arcadia, City of	3,526.00	- 3.55	+ 183.69 [£]	3,706.14	3,706.15	- 0.01	352.60	0.00
TOTAL	10,384.00	1,107.46	+ 313.22	11,804.68	12,377.25	-572.57	1,043.40 [£]	

a/ 1 acre-foot = 1 233 cubic metres.

b/ Based on modification of Judgment dated June 24, 1974.

c/ Includes annual carryover credit pursuant to modification of Judgment dated June 24, 1974.

d/ Spreading credit. See Table 9.

e/ Party did not request permission to exceed permissible overextraction and is in violation of the Judgment. However, it will take steps to eliminate its overextraction.

f/ Lease. See Table 11.

g/ Includes exchange pool transaction (Decreed Right: 516.00 acre-feet).

h/ Computation based on Decreed Right (516.00 acre-feet).

Table 13. ALLOWABLE EXTRACTIONS IN 1976-77
In acre-feet^{a/}

Party	Decreed Right, 1955	Carryover from 1975-76		Allowable Extraction ^{b/} (1976-77)
		Decreed Right	Spreading Credit	
Alhambra, City of	1,031.00	260.79 ^{c/}		1,291.79
Arcadia, City of				
Pasadena Subarea	1,167.00	31.97		1,198.97
Santa Anita Subarea	3,526.00	- 0.01		3,525.99
California-American				
Water Company	2,299.00	- 71.93		2,227.07
East Pasadena Water Co.	515.00	128.76 ^{c/}		643.76
H. E. Huntington Library				
and Art Gallery	262.00	- 20.03		241.97
Kinneloa Irrigation District	466.00 ^{d/}	490.55 ^{c/}	0.00	956.55
La Canada Irrigation District	100.00	49.82 ^{c/}		149.82
Las Flores Water Company	249.00	0.00	1.42	250.42
Lincoln Avenue Water Company	567.00	-191.93	0.00	375.07
Monrovia, City of	951.00	95.10		1,046.10
Pasadena Cemetery Association	91.00	9.10		100.10
Pasadena, City of				
Monk Hill Basin	4,464.00	122.43	67.46	4,653.89
Pasadena Subarea	8,343.00	0.00	175.35	8,518.35
Royal Laundry and				
Dry Cleaning Company	160.00 ^{d/}	11.00		171.00
Rubio Canon Land & Water				
Association	1,221.00	103.46	73.82	1,398.28
San Gabriel County Water				
District	1,091.00	- 0.01		1,090.99
Sierra Madre, City of	1,764.00	0.00	2,875.83 ^{e/}	4,639.83 ^{e/}
Sunny Slope Water Company	1,558.00	-203.39		1,354.61
Valley Water Company	797.00	8.46		805.46
TOTAL	30,622.00	824.14	3,193.88	34,640.02

a/ 1 acre-foot = 1 233 cubic metres.

b/ Does not include 1976-77 sales and leases of water right and spreading credit.

c/ Includes accumulated carryover as provided by Modification of Judgment of June 24, 1974.

d/ Includes Exchange Pool transactions.

e/ Includes spreading credit which varies each month.

Table 14. VARIATION OF ANNUAL
EXTRACTIONS FROM SAFE YIELD

In acre-feet (1 acre-foot = 1 233 cubic metres)

July 1 through June 30	Annual extractions				
	Western Unit		Subtotal	Eastern Unit ^{a/}	Raymond Basin Area
	Monk Hill Basin	Pasadena Subarea			
1950-51	7,098	13,418	20,516	2,861	23,377
51-52	5,903	10,750	16,653	2,041	18,694
52-53	5,973	12,471	18,444	4,535	22,979
53-54	6,283	11,765	18,048	4,163	22,211
54-55	<u>6,420</u>	<u>12,783</u>	<u>19,203</u>	<u>4,399</u>	<u>23,602</u>
Average annual extractions	6,363	11,683	18,046	3,639	21,685
Safe yield 1938 ^{b/}	6,039	11,621	17,660	3,791	21,451
Average difference ^{c/}	+ 324	+ 62	+ 386	- 152	+ 234
1955-56	6,319	14,060	20,379	4,687	25,066
56-57	7,057	17,474	24,531	5,685	30,216
57-58	5,916	16,054	21,970	3,823	25,793
58-59	8,160	18,027	26,187	7,018	33,205
59-60	7,992	16,428	24,420	4,858	29,278
1960-61	7,141	18,796	25,937	3,342 ^{d/}	29,279
61-62	6,742	18,419	25,161	3,496 ^{d/}	28,657
62-63	8,084	16,630	24,714	5,268	29,982
63-64	7,937	17,469	25,406	4,778 ^{d/}	30,184
64-65	7,450	17,682	25,132	3,599 ^{d/}	28,731
65-66	6,583	19,397	25,980	3,388 ^{d/}	29,368
66-67	5,096	17,241	22,337	3,369	25,706
67-68	7,059	19,984	27,043	7,031	34,074
68-69	8,397	15,490	23,887	4,511	28,398
69-70	8,422	18,710	27,132	5,445	32,577
1970-71	8,287	17,091	25,378	5,612	30,990
71-72	7,408	17,359	24,767	5,794	30,561
72-73	9,217	17,331	26,548	5,801	32,349
73-74	8,408	18,415	26,823	4,929	31,752
74-75	7,886	17,586	25,472	6,338	31,810
75-76	8,398	21,707	30,105	6,070	36,175
Average annual extractions	7,522	17,683	25,205	4,993	30,198
Safe yield 1952 ^{e/}	7,489	17,843	25,332	5,290	30,622
Average difference ^{e/}	+ 33	- 160	- 127	- 297	- 424

^{a/} Excludes salvaged water pumped by City of Sierra Madre.
^{b/} Effective 1944-45 through 1954-55 and excludes nonparty pumpage.
^{c/} Extractions greater than safe yield: (+).
Extractions less than safe yield: (-).
^{d/} Reduction in extraction by order of Watermaster.
^{e/} Effective 1955-56 through present and excludes nonparty pumpage.

5. ADMINISTRATIVE COSTS

Under the provisions of Section 4201, California Water Code, the cost of Watermaster service is shared equally by the State and the parties to the Judgment.

Before each December 15, the Watermaster, in cooperation with the Raymond Basin Advisory Board prepares the budget for the fiscal year, beginning on July 1. The 1975-76 budget, approved by the Board on December 19, 1974, is shown in Table 15.

Table 15. APPROVED BUDGET FOR 1975-76

PART "A" - Cost other than Part "B" and Part "C"

Salaries and wages	\$27,443	
Operating expenses	4,975	
Retirement and compensation plus administration	8,778	
Total Amount		\$41,196
One-half payable by State		\$20,598
One-half payable by parties		20,598
Less estimated carryover from 1974-75		0
Total collectable from parties		\$20,598

PART "B" - Cost of Exchange Water Program

Salaries and wages	\$ 83	
Retirement and compensation plus administration	27	
Total Amount		\$ 110
One-half payable by the State		\$ 55
One-half payable by participants in Exchange Pool		\$ 55

PART "C" - Cost of Determining Spreading Credits

Salaries and wages	\$ 1,570	
Operating expenses	427	
Retirement and compensation plus administration	503	
Total Amount		\$ 2,500
One-half payable by the State		\$ 1,250
One-half payable by participants spreading and recapturing surface water diversions		\$ 1,250

TOTAL ESTIMATED COST OF Watermaster Service
July 1, 1975 through June 30, 1976

\$43,806

RECOMMEND APPROVAL:

Jack J. Coe
Jack J. Coe
District Engineer and
Watermaster
Southern District

Date Dec 9, 1974

APPROVED:

Karl A. Johnson
Karl A. Johnson
Chairman
Raymond Basin Advisory Board

Date 11-14-74

The Raymond Basin budget contains three sections (Table 16): Part A supports the cost of administering the Raymond Basin Judgment. Each party's share of that cost is directly proportionate to the party's Decreed Right, 1955. Part B supports the cost of operating the Raymond Basin Exchange Pool. Only the parties participating in the Pool were charged for that cost. Part C supports the cost of determining the amount of surface water diversions for spreading and only the parties spreading for credit were charged for that cost. Each party's share of the 1975-76 budget is shown in Table 16. No penalties were assessed for late payments.

Income and expenditures under both parts of the budget appear in Table 17. Credit or debit balances shown there are carried forward into the next fiscal year, as directed by Sections 4358 and 4406 of the California Water Code and Paragraph XIII of the Judgment.

Cost of Determining Salvage Credit for City of Sierra Madre

On June 30, 1975, an adjusted debit balance of \$7.31 remained in the special account established to pay the cost of determining amounts of water salvaged by the City of Sierra Madre. During the 1975-76 season, on request, the City deposited \$400 in this account. Expenditures during this season totaled \$390.26. A credit balance of \$17.05 remained in the account on June 30, 1976.

Table 16. APPORTIONMENT OF 1975-76 BUDGET
In acre-feet (1 acre-foot = 1 233 cubic metres)

Party	PART A		PART B		PART C	
	"Decreed Right 1955" in Ac. Ft.	Apportionment to be paid	Exchange Pool Water in Ac. Ft.	Amount paid	Diversions 1973-74 ^{a/} in Ac. Ft.	Apportionment to be paid
Alhambra, City of	1,031	\$ 693.51				
Arcadia, City of	4,693	3,156.76				
California-American Water Company	2,299	1,546.43				
Canyon Mutual Water Company ^{b/}	127	85.43				
East Pasadena Water Company, Limited	515	346.42				
Henry E. Huntington Library and Art Gallery	262	176.24				
Kinneloa Irrigation District	229	154.04	50	27.50	8	\$ 4.05
La Canada Irrigation District	100	67.27			0 ^{c/}	0.00
Las Flores Water Company, The	249	167.49			41	20.77
Lincoln Avenue Water Company	567	381.39			64 ^{d/}	325.16
Mira Loma Mutual Water Company ^{b/}	148	99.55			24 ^{d/}	12.16
Monrovia, City of	951	639.69				
Ostorn Company ^{b/}	12	8.07				
Pasadena Cemetery Association	91	61.21				
Pasadena, City of	12,807	8,614.68			1,552 ^{e/}	786.06
Royal Laundry and Dry Cleaning Co.	110	73.99	50	27.50		
Rubio Canon Land and Water Association	1,221	821.31			201	101.80
San Gabriel County Water District	1,091	733.87				
Sierra Madre, City of	1,764	1,186.56				
Sunny Slope Water Company	1,558	1,047.99				
Valley Water Company	797	536.10				
TOTALS	30,622	\$ 20,598.00		\$55.00	2,468	\$1,250.00

^{a/} Surface water diversions for spreading, in acre-feet.

^{b/} Was a party at the time of billing.

^{c/} Will not be diverting.

^{d/} Estimated diversions.

^{e/} Diversions in Eaton Canyon.

Table 17. STATEMENT OF 1975-76 INCOME AND EXPENDITURES

Item	Parties	State	State and Parties
<u>Income</u>			
From Part A of the budget	\$20,598.00	\$20,598.00	\$41,196.00
From Part B of the budget	55.00	55.00	110.00
From Part C of the budget	1,250.00	1,250.00	2,500.00
Carryover from 1974-75	<u>663.83</u>	<u>-</u>	<u>663.83</u>
Total Income	\$21,239.17	\$21,903.00	\$43,142.17
<u>Expenditures^{a/}</u>			
From Part A of the budget			
Salaries and Wages	\$13,343.69	\$13,343.70	\$26,687.39
Operating expenses			
Miscellaneous indirect costs ^{b/}	5,164.69	5,164.68	10,329.37
Mobile Equipment rental and operation	393.56	393.56	787.12
Printing annual report	146.82	146.81	293.63
Chemical Laboratory	330.68	330.69	661.37
Electronic machine computing	1,156.76	1,156.76	2,313.52
General supplies and equipment	389.24	389.24	778.48
From Part B of the budget			
Salaries and wages	40.00	40.00	80.00
Miscellaneous indirect costs ^{b/}	15.00	15.00	30.00
From Part C of the budget			
Salaries and wages	800.00	800.00	1,600.00
Operating expenses	143.00	143.00	286.00
Miscellaneous indirect costs ^{b/}	<u>307.00</u>	<u>307.00</u>	<u>614.00</u>
Total Expenditures	\$22,230.44	\$22,230.44	\$44,460.88
BALANCE	-\$ 991.27 ^{c/}		

^{a/} Adjusted for 1974-75 delayed charges and credits.

^{b/} Rent, utilities, auto rental, janitorial services, communications, retirement, employees' health plan, and workmen's compensation insurance.

^{c/} Subject to delayed charges and credits.



APPENDIX A

**MEAN DAILY DISCHARGE AT SURFACE RUNOFF STATIONS
OPERATED BY THE WATERMASTER
1975-76 FISCAL YEAR**

APPENDIX A: MEAN DAILY DISCHARGE AT SURFACE RUNOFF STATIONS OPERATED BY THE WATERMASTER, 1975-76 FISCAL YEAR

STATION: ARCADIA WASH													STATION NO. 75450		FISCAL YEAR 1975-76	
MEAN DAILY DISCHARGE in second-foot *																
DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	DAY			
1	0.4	1.3	0.2	0.3	0.3	0.5	0.8	1.1	41.0	0.5	0.2	0.4	1			
2	0.4	1.2	0.2	0.3	0.4	0.5	0.9	1.0	0.4	0.5	0.2	0.4	2			
3	0.4	1.5	0.2	0.4	0.3	0.7	1.0	0.3	24.0	0.5	0.2	0.3	3			
4	0.4	0.8	0.2	0.4	0.4	0.5	1.0	0.0	0.3	0.2	0.2	0.3	4			
5	0.3	0.4	0.2	0.5	0.4	0.5	0.9	10.2	0.3	0.2	0.4	0.1	5			
6	0.3	0.4	0.3	2.4	0.4	0.5	0.4	26.5	0.2	0.1	0.4	0.4	6			
7	0.3	0.3	0.3	0.6	0.4	0.5	2.7	3.0	0.4	0.2	0.4	0.3	7			
8	0.2	0.4	0.4	0.4	0.4	0.6	0.9	24.5	0.3	1.0	0.1	0.4	8			
9	0.1	0.4	0.3	0.4	0.4	0.5	1.2	44.4	0.4	0.2	0.1	0.4	9			
10	0.1	0.5	0.3	0.5	0.4	0.7	1.2	0.6	0.1	0.2	0.1	1.1	10			
11	0.0	0.5	0.3	1.1	0.4	0.9	1.6	0.2	0.4	1.6	0.0	0.2	11			
12	0.0	0.4	0.5	0.8	0.4	0.4	1.4	0.3	0.3	11.9	0.2	0.2	12			
13	0.0	0.7	0.5	0.4	0.4	0.6	1.1	0.3	0.3	7.3	0.0	0.1	13			
14	0.0	0.5	0.5	0.3	0.5	0.4	1.2	0.3	0.3	0.2	0.0	0.1	14			
15	0.0	0.6	0.6	0.4	0.6	0.4	1.1	0.3	0.3	0.6	0.0	0.1	15			
16	0.1	0.7	1.4	0.4	0.5	0.5	0.7	0.4	0.3	0.1	0.2	0.3	16			
17	0.0	0.9	0.5	0.4	0.5	0.5	0.7	0.3	0.2	0.1	0.1	0.3	17			
18	0.1	1.2	0.5	0.4	0.5	0.5	1.4	0.3	0.2	0.2	0.2	0.4	18			
19	0.1	1.4	0.5	0.4	0.5	0.6	1.5	0.4	0.3	0.1	0.2	0.3	19			
20	0.2	1.3	0.7	0.4	0.4	0.5	1.5	0.3	0.3	0.2	0.2	0.4	20			
21	0.3	1.3	0.8	0.4	0.5	0.5	2.4	0.2	0.3	0.2	0.2	0.3	21			
22	0.3	1.7	0.7	0.5	0.4	0.6	1.7	0.2	0.3	0.2	0.1	0.3	22			
23	0.3	2.1	0.4	0.4	0.6	0.8	1.1	0.2	0.3	0.2	0.2	0.3	23			
24	0.4	2.3	0.4	0.4	0.6	0.8	1.3	0.2	0.3	0.1	0.2	0.3	24			
25	0.5	2.6	0.3	0.3	0.6	0.7	1.4	0.2	0.3	0.2	0.2	0.3	25			
26	0.5	2.1	0.3	0.5	0.6	0.8	1.5	0.2	0.3	0.2	0.3	0.3	26			
27	0.7	1.9	0.3	0.4	1.6	0.9	1.1	0.2	0.4	0.2	0.3	0.4	27			
28	0.7	0.5	0.3	0.4	0.5	0.9	2.0	0.3	0.4	0.2	0.3	0.3	28			
29	0.9	0.3	0.3	0.4	0.4	0.4	1.6	0.3	0.5	0.2	0.4	0.3	29			
30	1.1	0.2	0.4	0.7	0.4	0.9	1.5	0.5	0.5	0.2	0.5	0.3	30			
31	1.3	0.2		0.3		0.9	1.3		0.4		0.3		31			
MEAN	0.3	1.0	0.4	0.5	0.5	0.9	1.3	4.6	2.4	1.1	0.2	0.4	MEAN			
MAX.	1.3	2.6	1.4	2.4	1.6	8.3	2.7	49.4	41.0	11.9	0.5	1.1	MAX.			
MIN.	0	0.2	0.2	0.3	0.3	0.4	0.7	0.2	0.2	0.1	0	0.2	MIN.			
ACFT	20.3	61.1	25.7	31.5	29.5	54.6	80.4	266.2	148.1	63.4	12.6	22.0	ACFT			

* 1 SECOND-FOOT = 28.3 LITRES PER SECOND

FISCAL YEAR SUMMARY

MEAN		MAXIMUM					MINIMUM					TOTAL	
DISCHARGE		DISCHARGE	GAGE HT	MO	DAY	TIME	DISCHARGE	GAGE HT	MO	DAY	TIME	ACRE-Feet	
1.13		330.24	1.27	2	9	0255	0	0	7	9	1700	816.00	

STATION: ARROYO SECO													STATION NO. 42250		FISCAL YEAR 1975-76	
MEAN DAILY DISCHARGE in second-foot *																
DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	DAY			
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	NO FLOW	0.3	NO FLOW	1			
2	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.0	17.1	NO FLOW	0.3	NO FLOW	2			
3	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.0	0.6	NO FLOW	0.3	NO FLOW	3			
4	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.0	1.0	0.3	0.3	NO FLOW	4			
5	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.0	0.2	0.3	0.3	NO FLOW	5			
6	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	24.6	0.1	0.1	0.3	NO FLOW	6			
7	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	4.9	0.1	NO FLOW	0.3	NO FLOW	7			
8	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	15.6	0.0	NO FLOW	0.3	NO FLOW	8			
9	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.1	72.4	0.1	NO FLOW	0.3	NO FLOW	9			
10	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	33.7	0.1	NO FLOW	0.2	NO FLOW	10			
11	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	2.5	0.1	NO FLOW	0.1	NO FLOW	11			
12	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.6	0.1	0.4	0.1	NO FLOW	12			
13	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.4	0.3	0.9	0.0	NO FLOW	13			
14	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.4	0.1	1.3	NO FLOW	NO FLOW	14			
15	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.4	0.2	0.3	0.1	NO FLOW	15			
16	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.4	0.2	0.4	NO FLOW	NO FLOW	16			
17	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.4	0.1	0.2	NO FLOW	NO FLOW	17			
18	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.3	0.1	0.2	NO FLOW	NO FLOW	18			
19	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.2	0.1	0.3	NO FLOW	NO FLOW	19			
20	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.2	NO FLOW	0.3	NO FLOW	0.1	20			
21	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.2	NO FLOW	0.7	0.1	NO FLOW	21			
22	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.1	NO FLOW	0.2	0.4	NO FLOW	22			
23	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.2	NO FLOW	0.2	0.2	NO FLOW	23			
24	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.2	NO FLOW	0.2	0.1	NO FLOW	24			
25	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.1	0.2	0.2	0.1	NO FLOW	25			
26	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.1	0.2	0.2	0.1	NO FLOW	26			
27	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.1	0.1	0.2	0.2	NO FLOW	27			
28	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.1	0.1	0.2	NO FLOW	NO FLOW	28			
29	0.0	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	NO FLOW	0.1	0.1	0.2	NO FLOW	NO FLOW	29			
30	0.0	NO FLOW	NO FLOW	NO FLOW	0.0	NO FLOW	NO FLOW	0.1	0.1	0.2	NO FLOW	0.1	30			
31	0.0	0.0		0.0		NO FLOW	0.3		0.0		0.0		31			
MEAN		0	0	0	0	0	0	5.6	2.3	0.6	0.1	0	MEAN			
MAX.		0	0	0	0	0	0	72.4	47.0	9.9	0.4	0.1	MAX.			
MIN.		0	0	0	0	0	0	0	0	0	0	0	MIN.			
ACFT		0	0	0	0	0	0	322.7	144.1	73.7	9.0	0.5	ACFT			

* 1 SECOND-FOOT = 28.3 LITRES PER SECOND

FISCAL YEAR SUMMARY

MEAN		MAXIMUM					MINIMUM					TOTAL	
DISCHARGE		DISCHARGE	GAGE HT	MO	DAY	TIME	DISCHARGE	GAGE HT	MO	DAY	TIME	ACRE-Feet	
0.72		156.93	1.75	2	9	0616	0	0	6	1	0000	510.70	

APPENDIX A (continued)

STATION: BROADWAY DRAIN													STATION NO.	FISCAL YEAR
MEAN DAILY DISCHARGE in second-foot *													75135	1975-76
DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	DAY	
1	0.5	0.4	0.6	0.4	0.2	0.5	0.5	0.4	0.2	0.3	0.9	3.0	1	
2	0.5	0.4	0.7	0.5	0.3	0.7	0.7	0.6	0.5	0.3	1.2	3.1	2	
3	0.6	0.4	0.5	0.4	0.4	0.5	0.6	0.4	0.6	0.3	1.0	2.1	3	
4	0.4	0.5	0.7	0.5	0.4	0.4	0.5	0.1	0.3	0.7	0.9	1.1	4	
5	0.4	0.5	0.5	0.5	0.4	0.4	0.6	0.6	0.6	0.4	1.2	2.2	5	
6	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.9	0.6	0.3	2.2	2.2	6	
7	0.4	0.5	0.4	0.6	0.5	0.3	0.4	4.3	0.4	0.4	2.4	2.8	7	
8	0.8	0.6	0.4	1.0	0.4	0.3	0.4	6.4	4.0	2.4	0.2	4.3	8	
9	0.7	0.7	0.5	0.4	0.4	0.3	0.4	11.4	2.4	0.6	0.7	4.4	9	
10	0.6	0.5	0.5	0.3	0.4	0.4	0.4	0.9	1.5	0.5	0.7	6.1	10	
11	0.5	0.7	1.0	1.7	0.4	0.4	0.4	0.4	0.8	0.5	0.9	3.5	11	
12	0.7	0.6	0.7	0.3	0.4	0.5	0.5	0.4	0.4	2.9	1.6	4.7	12	
13	0.5	0.4	0.6	0.7	0.4	0.8	0.5	0.5	0.4	4.1	2.8	2.1	13	
14	0.5	0.5	0.7	0.3	0.7	1.5	0.5	0.4	0.3	0.4	2.4	2.4	14	
15	0.6	0.4	0.6	0.3	0.2	1.0	0.4	0.4	0.4	0.7	2.5	2.5	15	
16	0.5	0.8	1.1	0.3	0.2	1.5	0.4	0.4	0.4	0.4	2.4	2.9	16	
17	0.6	0.5	1.3	0.6	0.3	0.5	0.3	0.4	0.4	1.1	2.2	2.5	17	
18	0.6	0.6	1.0	0.4	0.3	0.6	0.6	0.4	0.7	0.6	1.6	3.0	18	
19	0.5	0.7	1.0	0.4	0.2	0.5	0.4	0.4	0.4	0.7	1.6	2.7	19	
20	0.5	0.8	0.9	0.4	0.3	0.5	0.4	0.4	0.3	0.5	3.3	2.2	20	
21	0.4	0.9	0.9	0.4	0.2	0.4	0.4	0.4	0.5	0.5	4.8	3.0	21	
22	0.4	0.8	0.9	0.8	0.2	0.5	0.4	0.4	0.4	0.5	2.7	2.1	22	
23	0.4	0.5	0.8	1.3	0.3	2.0	0.4	0.5	0.3	0.5	1.9	2.7	23	
24	0.4	0.5	0.6	0.3	0.1	4.7	0.4	0.3	0.3	0.5	5.3	2.9	24	
25	0.4	0.5	0.5	0.2	0.6	1.5	0.3	0.3	0.3	0.9	4.5	3.0	25	
26	0.4	0.6	0.5	0.2	0.7	1.6	0.3	0.3	0.3	0.6	2.5	3.5	26	
27	0.4	0.7	0.7	0.3	0.5	1.3	0.3	0.3	0.3	0.2	3.8	2.7	27	
28	0.4	0.5	0.9	0.2	0.6	0.9	0.3	0.2	0.3	0.2	3.8	3.8	28	
29	0.4	0.4	0.9	0.3	0.5	0.8	0.3	0.3	0.4	0.3	1.1	4.4	29	
30	0.4	0.4	0.7	0.5	0.4	0.5	0.4	0.3	0.3	0.6	1.2	3.3	30	
31	0.4	1.4		0.4		0.6	0.4		0.3		1.3		31	
MEAN	.5	.6	.7	.5	.4	1.0	.4	1.7	2.1	.8	2.1	3.0	MEAN	
MAX.	.8	1.4	1.3	1.7	.7	4.7	.7	11.4	48.6	4.1	5.3	6.1	MAX.	
MIN.	.4	.4	.4	.2	.1	.3	.3	.2	.3	.2	.2	2.1	MIN.	
ACFT	10.3	36.6	42.5	30.9	22.9	61.2	26.8	100.1	127.2	45.2	127.9	181.2	ACFT	

* 1 SECOND-FOOT = 28.3 LITRES PER SECOND

FISCAL YEAR SUMMARY

MEAN	MAXIMUM					MINIMUM					TOTAL
DISCHARGE	DISCHARGE	GAGE HT	MO	DAY	TIME	DISCHARGE	GAGE HT	MO	DAY	TIME	ACFT-FFET
1.15	66.31	.77	2	9	0228	0	.01	11	24	1000	832.80

STATION: EATON CREEK NEAR PASADENA													STATION NO.	FISCAL YEAR
MEAN DAILY DISCHARGE in second-foot *													75160	1975-76
DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	DAY	
1	0.9	0.0	0.0	1.1	0.1	0.4	0.2	0.5	17.8	1.2	3.1	0.7	1	
2	0.9	0.0	0.1	0.6	0.1	0.4	0.2	0.6	13.7	1.2	2.4	0.6	2	
3	0.3	0.0	0.0	0.4	0.1	0.3	0.3	2.0	12.8	1.1	1.7	0.3	3	
4	0.2	0.1	0.0	0.0	0.0	0.4	0.3	4.6	12.0	2.0	1.7	0.3	4	
5	0.1	0.1	0.0	0.0	0.0	0.4	0.3	8.9	9.6	1.7	1.7	0.3	5	
6	0.1	0.1	0.0	0.0	0.1	0.3	0.3	11.3	7.3	1.6	1.9	0.6	6	
7	0.1	0.1	0.0	0.0	0.1	0.2	0.3	0.0	6.9	1.6	2.4	1.5	7	
8	0.2	0.1	0.0	0.0	0.0	0.2	0.3	1.6	6.5	1.5	2.0	1.2	8	
9	0.2	0.1	0.0	0.0	0.4	0.2	0.3	19.6	6.3	1.4	1.7	1.5	9	
10	0.2	0.1	0.0	0.0	6.1	0.2	0.3	12.4	6.4	1.4	1.6	1.1	10	
11	0.2	0.1	0.0	0.0	7.8	0.2	0.3	7.6	5.7	1.4	1.4	0.8	11	
12	0.2	0.1	0.0	0.1	0.6	0.8	0.2	6.0	5.1	1.8	1.3	0.4	12	
13	0.4	0.1	0.0	0.1	0.9	0.8	0.2	3.4	4.4	1.2	0.6	0.6	13	
14	0.7	0.1	0.0	0.0	0.8	0.7	0.1	3.0	3.9	2.3	1.1	0.4	14	
15	0.2	0.1	0.0	0.0	1.6	0.6	0.1	2.8	3.5	2.4	1.1	0.3	15	
16	0.2	0.1	0.0	0.0	2.7	0.6	0.1	4.8	3.4	2.4	1.1	0.3	16	
17	0.2	0.1	0.0	0.0	2.8	0.6	0.3	8.1	3.2	2.8	1.1	0.3	17	
18	0.2	0.1	0.0	0.0	3.0	0.6	0.5	6.1	3.1	2.5	1.0	0.3	18	
19	0.3	0.1	0.0	0.1	3.0	0.6	0.1	5.7	3.0	2.2	0.9	0.4	19	
20	0.1	0.1	0.0	0.1	3.0	0.6	0.1	5.4	2.4	2.0	0.8	2.3	20	
21	0.1	0.1	0.0	0.1	3.0	0.6	0.4	3.6	2.0	2.0	0.8	3.9	21	
22	0.1	0.1	0.0	0.1	2.8	0.6	0.4	1.6	1.7	1.9	0.9	2.5	22	
23	0.1	0.1	0.0	0.1	1.5	0.5	0.6	1.4	1.5	2.0	0.6	2.7	23	
24	0.1	0.1	0.0	0.1	0.5	0.4	1.2	1.2	1.4	2.0	0.3	2.5	24	
25	0.1	0.1	0.0	0.1	0.4	0.4	2.2	1.1	1.3	1.9	0.4	1.8	25	
26	0.1	0.1	0.0	0.1	0.3	0.4	2.2	1.0	1.2	1.9	0.5	0.3	26	
27	0.1	0.1	0.5	0.1	0.4	0.3	2.2	0.9	1.2	2.0	0.4	0.2	27	
28	0.1	0.1	1.5	0.1	0.4	0.3	2.1	0.9	1.2	2.0	0.4	0.2	28	
29	0.1	0.0	1.8	0.1	0.4	0.3	2.2	1.1	1.2	1.7	0.5	0.1	29	
30	0.1	0.0	2.0	0.1	0.4	0.2	1.5		1.2	1.7	0.6	0.1	30	
31	0.1	0.0		0.1		0.2	0.5		1.2		0.6		31	
MEAN	.2	.1	.2	.1	1.6	.4	.7	4.4	4.9	2.1	1.2	.9	MEAN	
MAX.	.9	.1	2.0	1.1	7.8	.8	2.2	19.6	17.8	5.9	3.1	3.9	MAX.	
MIN.	.1	0	0	0	0	.2	.1	.1	1.2	1.1	.3	.1	MIN.	
ACFT	13.4	4.5	12.9	6.4	97.3	26.8	41.0	252.6	301.8	123.9	74.2	56.3	ACFT	

* 1 SECOND-FOOT = 28.3 LITRES PER SECOND

FISCAL YEAR SUMMARY

MEAN	MAXIMUM					MINIMUM					TOTAL
DISCHARGE	DISCHARGE	GAGE HT	MO	DAY	TIME	DISCHARGE	GAGE HT	MO	DAY	TIME	ACFT-FFET
1.40	39.74	1.27	3	1	0850	0	0	9	8	1700	1011.10

APPENDIX A (continued)

STATION: EATON WASH													STATION NO.		FISCAL YEAR	
MEAN DAILY DISCHARGE in second-foot *													7500		1975-76	
DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	MAX.	MIN.	ACFT
1	0.0	0.2	0.0	0.1	0.0	0.5	0.0	0.0	4.9	0.1	0.0	0.1	1			
2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	11.4	0.0	0.0	0.0	2			
3	0.1	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.4	5.4	0.0	0.0	3			
4	0.0	0.2	0.1	0.1	0.1	0.1	0.1	4.0	0.0	0.9	0.0	0.0	4			
5	0.0	0.1	0.2	0.0	0.0	0.2	0.2	25.0	0.0	0.0	0.0	0.0	5			
6	0.0	0.1	0.1	1.8	0.0	0.1	1.0	20.4	0.0	0.0	1.8	0.0	6			
7	0.0	0.1	0.2	0.3	0.1	0.1	0.1	8.2	0.0	0.2	1.1	0.0	7			
8	0.1	0.1	0.2	0.0	0.1	0.3	0.1	25.2	0.0	4.1	0.3	0.0	8			
9	0.1	0.1	0.1	0.1	0.0	0.1	0.0	36.7	1.6	0.0	0.1	0.0	9			
10	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.6	0.2	0.0	0.0	2.8	10			
11	0.1	0.1	0.1	1.4	0.0	0.2	0.0	0.2	0.0	0.0	0.2	0.0	11			
12	0.0	0.2	0.0	0.0	0.0	11.1	0.0	0.2	0.0	4.6	0.1	0.0	12			
13	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.1	0.0	5.0	0.3	0.0	13			
14	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	14			
15	0.1	0.1	0.0	0.0	0.6	0.0	0.0	0.1	0.0	1.1	0.1	0.1	15			
16	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	1.4	0.1	0.0	0.0	16			
17	0.0	0.1	0.4	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	17			
18	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	18			
19	0.0	0.2	0.1	0.1	0.6	0.1	0.1	0.0	0.0	0.1	0.2	0.0	19			
20	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	20			
21	0.1	0.3	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	21			
22	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	22			
23	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	23			
24	0.4	0.1	0.0	0.1	0.1	0.1	0.0	0.0	1.6	0.0	0.0	0.0	24			
25	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.5	0.0	0.1	0.2	25			
26	0.0	0.4	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.1	0.1	26			
27	0.1	0.9	0.0	0.1	1.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	27			
28	0.2	0.1	0.1	0.1	1.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	28			
29	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.6	0.0	0.0	0.1	0.0	29			
30	0.1	0.0	0.1	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	30			
31	0.2	0.0		0.0		0.1	0.1		0.1		0.1		31			
MEAN	.1	.1	.1	.2	.2	.5	.1	4.4	.8	.9	.2	.1	MEAN			
MAX.	.4	.9	.4	1.8	1.1	11.1	1.0	36.7	11.9	9.6	1.8	2.8	MAX.			
MIN.	0	0	0	0	0	0	0	0	0	0	0	0	MIN.			
ACFT	5.2	9.0	5.3	12.0	9.7	28.5	5.2	251.9	44.1	54.0	10.6	8.1	ACFT			

* 1 SECOND-FOOT = 28.3 LITRES PER SECOND

FISCAL YEAR SUMMARY

MEAN	MAXIMUM					MINIMUM					TOTAL
	DISCHARGE	GAGE HT	MO	DAY	TIME	DISCHARGE	GAGE HT	MO	DAY	TIME	
.64	430.01	1.51	2	9	0243	0	0	7	6	1326	445.60

STATION: FLINT WASH													STATION NO.		FISCAL YEAR	
MEAN DAILY DISCHARGE in second-foot *													42190		1975-76	
DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	MAX.	MIN.	ACFT
1	0.3	0.4	0.2	0.1	0.4	0.4	0.4	0.0	2.4	0.3	0.4	0.3	1			
2	0.3	0.4	0.2	0.1	0.3	0.4	0.3	0.0	1.4	0.4	0.4	0.3	2			
3	0.3	0.4	0.2	0.2	0.2	0.2	0.0	0.0	1.1	7.4	0.4	0.2	3			
4	0.4	0.4	0.2	0.1	0.2	0.2	0.0	0.2	0.8	1.1	0.6	0.3	4			
5	0.4	0.3	0.3	0.1	0.2	0.2	0.0	0.9	0.7	0.3	0.8	0.3	5			
6	0.4	0.2	0.4	0.4	0.2	0.4	0.1	2.8	0.7	0.4	4.0	0.2	6			
7	0.3	0.4	0.3	0.4	0.3	0.3	0.1	3.7	0.6	0.3	0.9	0.3	7			
8	0.4	0.4	0.3	0.1	0.4	0.3	0.0	4.9	0.5	2.6	0.4	0.2	8			
9	0.4	0.3	0.3	0.0	0.2	0.2	0.1	4.6	0.6	0.4	0.3	0.3	9			
10	0.3	0.4	0.3	0.0	0.2	0.3	0.0	3.9	1.1	0.3	0.3	2.4	10			
11	0.4	0.4	0.3	0.1	0.2	0.2	0.0	1.2	0.7	0.3	0.3	0.2	11			
12	0.5	0.3	0.4	0.3	0.2	16.7	0.0	0.6	0.4	16.8	0.4	0.3	12			
13	0.4	0.3	0.4	0.3	0.1	0.6	0.0	0.5	0.4	8.2	0.3	0.3	13			
14	0.3	0.3	0.3	0.2	0.2	0.3	0.0	0.3	0.3	0.4	0.3	0.3	14			
15	0.4	0.3	0.2	0.2	0.2	0.6	0.0	0.4	0.3	2.4	0.4	0.3	15			
16	0.4	0.3	0.2	0.1	0.2	0.3	0.0	0.5	0.3	0.4	0.3	0.2	16			
17	0.3	0.3	0.3	0.2	0.4	0.3	0.0	0.4	0.3	0.5	0.3	0.3	17			
18	0.4	0.3	0.2	0.2	0.3	0.3	0.0	0.4	0.3	0.5	0.3	0.3	18			
19	0.4	0.3	0.2	0.2	0.3	0.3	0.0	0.3	0.3	0.4	0.3	0.2	19			
20	0.5	0.3	0.3	0.2	0.2	0.4	0.0	0.2	0.4	0.4	0.2	0.2	20			
21	0.4	0.3	0.4	0.2	0.2	0.4	0.0	0.3	0.3	0.3	0.3	0.2	21			
22	0.4	0.3	0.4	0.2	0.3	0.3	0.0	0.2	0.3	0.3	0.4	0.2	22			
23	0.4	0.3	0.2	0.1	0.4	0.3	0.0	0.2	0.3	0.3	0.3	0.3	23			
24	0.4	0.3	0.3	0.2	0.3	0.3	0.0	0.2	0.4	0.4	0.2	0.3	24			
25	0.4	0.3	0.0	0.2	0.3	0.4	0.0	0.2	0.3	0.3	0.3	0.4	25			
26	0.4	0.4	0.1	0.2	0.3	0.3	0.0	0.2	0.3	0.3	0.3	0.2	26			
27	0.4	0.4	0.1	0.2	0.3	0.5	0.0	0.2	0.4	0.3	0.3	0.1	27			
28	0.3	0.2	0.1	0.2	1.0	0.4	0.0	0.2	0.4	0.3	0.3	0.2	28			
29	0.3	0.3	0.1	0.2	0.4	0.3	0.0	0.3	0.4	0.3	0.5	0.3	29			
30	0.3	0.3	0.1	1.1	0.4	0.3	0.0	0.3	0.4	0.4	0.2	0.4	30			
31	0.3	0.2		0.2		0.3	0.0		0.3		0.3		31			
MEAN	.4	.3	.3	.4	.3	.9	.1	1.0	.6	1.6	.5	.3	MEAN			
MAX.	.5	.4	.4	0.1	1.0	16.7	.4	4.9	2.6	16.8	4.0	2.8	MAX.			
MIN.	.3	.2	0	0	.1	.2	0	0	.3	.3	.2	.1	MIN.			
ACFT	23.2	19.7	15.0	24.3	16.9	53.2	3.5	54.0	34.4	93.0	29.2	20.7	ACFT			

* 1 SECOND-FOOT = 28.3 LITRES PER SECOND

FISCAL YEAR SUMMARY

MEAN	MAXIMUM					MINIMUM					TOTAL
	DISCHARGE	GAGE HT	MO	DAY	TIME	DISCHARGE	GAGE HT	MO	DAY	TIME	
.56	232.86	2.58	12	12	1040	0	0	3	25	0000	348.00

APPENDIX A (continued)

STATION: RUBIO DRAIN				MEAN DAILY DISCHARGE in second-foot *							STATION NO. 75220		FISCAL YEAR 1975-76	
DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	DAY	
1	1.2	1.7	1.3	1.1	1.1	1.1	0.7	1.2	94.7	1.7	1.0	1.2	1	
2	1.5	1.7	1.3	1.3	1.1	1.1	0.7	1.2	67.5	4.5	1.0	1.1	2	
3	1.5	1.7	1.3	1.4	1.2	1.1	0.7	1.1	1.6	0.8	1.1	1.1	3	
4	1.7	1.3	1.4	1.6	1.1	1.1	0.8	23.1	1.6	3.2	1.0	1.3	4	
5	1.7	1.2	1.5	1.7	1.1	0.8	1.0	49.1	1.1	1.0	1.5	1.3	5	
6	1.7	1.2	1.6	8.3	1.2	0.8	1.2	75.1	0.9	1.1	3.9	1.4	6	
7	1.6	1.3	1.4	2.6	1.1	0.8	0.9	15.6	1.0	1.2	4.1	1.9	7	
8	1.4	1.5	1.5	1.1	1.1	0.9	0.8	54.9	1.1	4.9	1.1	1.4	8	
9	1.5	1.5	1.4	1.1	1.1	0.7	0.9	89.5	2.5	1.0	1.0	1.4	9	
10	1.5	1.4	1.2	1.1	1.1	0.7	0.9	1.9	2.3	0.8	1.2	4.4	10	
11	1.5	1.4	1.4	7.7	1.1	0.8	0.9	0.8	1.2	0.8	1.1	1.3	11	
12	1.7	1.5	1.1	1.2	1.1	24.1	1.2	0.7	1.2	23.4	1.2	1.2	12	
13	1.6	1.5	1.3	1.1	1.0	1.0	1.1	0.8	1.4	4.4	1.0	1.2	13	
14	1.5	1.5	1.1	1.1	0.9	0.5	1.1	0.8	1.0	0.7	1.1	1.1	14	
15	1.5	1.5	1.1	1.2	1.1	11.0	1.1	0.8	1.3	2.1	1.1	1.4	15	
16	1.5	1.5	1.1	1.0	1.1	0.5	1.2	1.0	1.2	0.8	1.0	1.1	16	
17	1.5	1.5	1.1	0.9	1.2	0.5	1.2	1.4	2.7	0.6	1.1	1.3	17	
18	1.5	1.5	1.1	1.1	1.0	0.7	1.2	1.3	4.2	0.6	1.1	1.3	18	
19	1.5	1.6	1.1	0.9	1.0	0.7	1.3	1.3	4.4	1.0	1.3	1.5	19	
20	1.5	1.5	1.1	0.9	1.2	0.7	1.2	1.3	1.8	0.9	1.2	1.4	20	
21	1.3	1.4	1.1	1.1	1.1	0.7	1.3	1.4	1.4	0.9	1.3	1.4	21	
22	1.3	1.5	1.2	1.0	1.0	0.8	1.7	1.1	4.7	1.0	1.3	1.4	22	
23	1.3	1.6	1.3	1.0	0.9	0.8	1.6	1.6	1.4	0.9	1.2	1.4	23	
24	1.5	1.4	1.3	0.9	0.9	0.7	1.6	1.2	1.5	1.0	1.3	1.5	24	
25	1.5	1.3	1.5	1.1	1.1	0.9	1.4	1.1	1.6	0.9	1.3	1.7	25	
26	1.5	1.3	1.5	0.9	1.0	0.9	1.2	1.2	1.7	1.1	1.4	1.9	26	
27	1.5	1.3	1.5	1.1	3.4	0.9	1.3	1.3	1.5	0.8	1.3	1.7	27	
28	1.6	1.1	1.5	1.1	4.7	0.6	1.3	1.2	1.5	0.9	1.2	1.5	28	
29	1.4	1.2	1.2	1.1	1.2	0.8	1.2	1.1	1.6	0.9	1.2	1.4	29	
30	1.5	1.2	1.1	2.4	1.1	0.9	1.4	1.6	1.6	1.0	1.1	1.9	30	
31	1.6	1.2		1.4		0.8	1.5		1.8		1.2		31	
MEAN	1.5	1.4	1.3	1.7	1.3	1.9	1.1	11.2	6.9	2.4	1.3	1.4	MEAN	
MAX.	1.7	1.7	1.6	8.3	4.7	24.1	1.7	80.5	94.7	23.4	4.1	8.4	MAX.	
MIN.	1.2	1.1	1.1	0.9	0.9	0.5	0.7	0.7	0.8	0.6	1.1	1.1	MIN.	
ACFT	93.3	87.7	76.4	101.9	75.4	115.4	70.5	644.5	426.3	155.0	82.2	97.4	ACFT	

* 1 SECOND-FOOT = 28.3 LITRES PER SECOND

FISCAL YEAR SUMMARY

MEAN		MAXIMUM					MINIMUM					TOTAL	
DISCHARGE	2.82	DISCHARGE	GAGE HT	MO	DAY	TIME	DISCHARGE	GAGE HT	MO	DAY	TIME	ACFT-FFET	2025.70
		1041.22	2.29	2	9	0255	.22	.01	12	15	1155		

STATION: BECO DRAIN										STATION NO.		FISCAL YEAR	
										62150		1975-76	
MEAN DAILY DISCHARGE in second-foot *													
DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	DAY
1	0.8	0.5	0.5	0.6	0.5	0.8	0.3	0.6	0.4	0.4	0.4	0.5	1
2	0.8	0.5	0.5	0.6	0.4	0.9	0.3	0.4	14.1	0.3	0.4	0.4	2
3	1.2	0.5	0.5	0.5	0.2	0.7	0.3	0.4	0.8	3.0	0.4	0.4	3
4	1.6	0.4	0.5	0.6	0.2	0.7	0.3	6.0	0.1	0.8	0.4	0.4	4
5	1.6	0.5	0.6	0.7	0.3	0.7	0.3	12.8	0.1	0.3	0.4	0.4	5
6	1.3	0.4	0.5	0.4	0.2	0.7	0.2	62.4	0.2	0.3	0.9	0.5	6
7	1.3	0.5	0.5	0.9	0.3	0.7	0.2	54.3	0.3	0.3	0.6	0.5	7
8	1.2	0.5	0.5	0.7	1.4	0.8	0.3	17.6	0.3	2.3	0.3	0.5	8
9	1.3	0.7	0.4	0.7	0.2	0.7	0.2	34.1	1.0	0.3	0.3	0.6	9
10	1.0	0.7	0.4	0.7	0.3	0.7	0.2	0.5	0.6	0.4	0.3	2.1	10
11	0.9	0.8	0.4	2.0	0.3	5.2	0.1	0.3	0.3	0.3	0.3	0.6	11
12	1.0	0.6	0.7	0.2	0.1	5.3	0.1	0.2	0.3	7.3	0.3	0.6	12
13	1.0	0.6	0.4	0.7	0.2	0.7	0.2	0.3	0.2	2.0	0.4	0.6	13
14	0.9	0.6	0.4	0.3	0.3	0.8	0.3	0.3	0.1	0.4	0.3	0.6	14
15	0.7	0.6	0.6	0.3	0.3	0.8	0.3	0.2	0.1	0.5	0.3	0.7	15
16	0.7	0.5	0.6	0.3	0.3	0.1	0.3	0.2	0.1	0.3	0.5	0.7	16
17	0.8	0.4	0.6	0.4	0.2	0.1	0.3	0.1	0.1	0.3	0.3	0.7	17
18	0.9	0.5	0.6	0.4	0.2	0.1	0.3	0.2	0.1	0.3	0.3	0.6	18
19	0.3	0.5	0.6	0.4	0.2	0.1	0.4	0.3	0.1	0.4	0.4	0.6	19
20	0.0	0.6	0.6	0.5	0.2	0.1	0.3	0.3	0.1	0.3	0.5	0.7	20
21	0.2	0.4	2.0	0.5	0.2	0.1	0.4	0.4	0.1	0.3	0.4	0.6	21
22	0.4	0.7	1.0	0.6	0.2	0.1	0.4	0.4	0.1	0.4	0.4	0.6	22
23	0.5	0.8	0.8	0.5	0.2	0.2	0.4	0.4	0.1	0.4	0.3	0.5	23
24	0.5	0.7	0.6	0.3	0.2	0.3	0.3	0.4	0.1	0.3	0.5	0.6	24
25	0.4	0.7	0.3	0.3	0.3	0.3	0.3	0.4	0.2	0.3	0.5	0.6	25
26	0.4	0.7	0.3	0.2	0.3	0.3	0.5	0.4	0.2	0.3	0.4	0.6	26
27	0.6	0.5	0.3	0.1	0.7	0.3	0.3	0.4	0.2	0.5	0.5	0.6	27
28	0.5	0.4	0.3	0.3	0.6	0.3	0.3	0.4	0.2	0.4	0.5	0.6	28
29	0.4	0.4	0.3	0.4	0.8	0.4	0.3	0.4	0.3	0.4	0.5	0.8	29
30	0.4	0.4	0.5	0.8	0.6	0.5	0.3		0.2	0.4	0.5	0.7	30
31	0.4	0.4		0.5		0.3	0.4		0.2		0.4		31
MEAN	0.8	0.6	0.6	0.5	0.5	0.8	0.3	6.7	0.7	0.8	0.4	0.6	MEAN
MAX.	1.6	0.8	2.0	2.0	6.6	5.3	0.5	62.4	14.1	7.3	0.9	2.1	MAX.
MIN.	0	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.4	MIN.
ACFT	47.8	34.1	37.1	37.8	32.3	47.5	17.8	387.4	42.3	48.7	25.5	37.4	ACFT

* 1 SECOND-FOOT = 28.3 LITRES PER SECOND

FISCAL YEAR SUMMARY

MEAN		MAXIMUM					MINIMUM					TOTAL	
DISCHARGE	1.11	DISCHARGE	GAGE HT	MO	DAY	TIME	DISCHARGE	GAGE HT	MO	DAY	TIME	ACFT-FFET	787.90
		226.07	1.50	2	9	0219	0	0	7	19	2400		

APPENDIX A (continued)

STATION: WEST ALTADENA													STATION NO. AP445	FISCAL YEAR 1975-76
MEAN DAILY DISCHARGE in second-foot *														
DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	
1	0.4	0.2	0.1	0.3	0.3	0.3	0.0	0.1	0.2	0.2	0.2	0.1	1	
2	0.4	0.6	0.0	0.4	0.2	0.2	0.0	0.3	0.2	0.1	0.1	0.2	2	
3	0.2	0.5	0.1	0.5	0.2	0.2	0.0	0.2	0.2	0.4	0.1	0.0	3	
4	0.2	0.3	0.3	0.5	0.2	0.2	0.1	1.1	0.1	0.3	0.3	0.0	4	
5	0.1	0.6	0.4	0.5	0.2	0.3	0.1	6.9	0.1	0.4	0.9	0.0	5	
6	0.1	0.4	0.3	0.8	0.2	0.3	0.3	2.2	0.3	0.4	1.1	0.1	6	
7	0.2	0.6	0.2	1.0	0.2	0.3	0.0	1.4	0.4	0.5	0.5	0.0	7	
8	0.4	0.5	0.3	0.6	0.7	0.3	0.0	7.5	1.6	0.5	0.3	0.0	8	
9	0.4	0.4	0.4	0.4	0.1	0.3	0.1	7.4	0.3	0.0	0.3	0.0	9	
10	0.4	0.4	0.2	0.4	0.1	0.2	0.2	0.5	0.2	0.0	0.3	0.7	10	
11	0.3	1.0	0.3	3.4	0.2	0.2	0.1	0.2	0.4	0.1	0.1	0.1	11	
12	0.3	0.4	0.2	0.2	0.2	3.8	0.1	0.2	0.3	3.2	0.2	0.1	12	
13	0.3	0.4	0.2	0.4	0.2	0.7	0.1	0.4	0.3	0.2	0.1	0.0	13	
14	0.3	0.3	0.2	0.3	0.2	0.3	0.1	0.4	0.3	0.0	0.3	0.1	14	
15	0.3	0.4	0.2	0.2	0.1	0.2	0.1	0.3	0.3	0.4	0.2	0.3	15	
16	0.2	0.7	0.2	0.4	0.1	0.2	0.3	0.2	0.6	0.1	0.3	0.2	16	
17	0.2	0.3	0.3	0.3	0.1	0.0	0.2	0.0	0.4	0.3	0.1	0.3	17	
18	0.4	0.6	0.2	0.3	0.0	0.2	0.2	0.0	0.2	0.0	0.2	0.3	18	
19	0.4	0.6	0.2	0.3	0.0	0.3	0.2	0.0	0.3	0.1	0.3	0.2	19	
20	0.3	0.4	0.2	0.2	0.1	0.2	0.2	0.0	0.3	0.0	0.3	0.4	20	
21	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.1	0.3	0.1	0.1	0.1	21	
22	0.1	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.0	0.2	22	
23	0.1	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.0	0.3	23	
24	0.1	0.4	0.2	0.2	0.2	0.5	0.2	0.2	0.2	0.4	0.3	0.4	24	
25	0.1	0.3	0.2	0.2	0.5	0.5	0.2	0.2	0.1	0.2	0.0	0.4	25	
26	0.1	0.6	0.2	0.2	0.1	0.5	0.2	0.2	0.1	0.2	0.1	0.2	26	
27	0.1	0.7	0.2	0.2	0.3	0.5	0.2	0.2	0.3	0.2	0.0	0.4	27	
28	0.2	0.2	0.2	0.2	0.9	0.7	0.1	0.3	0.1	0.3	0.0	0.5	28	
29	0.2	0.0	0.2	0.2	0.3	0.5	0.1	0.3	0.1	0.1	0.0	0.3	29	
30	0.1	0.1	0.4	0.4	0.1	0.2	0.1		0.2	0.2	0.0	0.3	30	
31	0.2	0.0		0.1		0.1	0.1		0.1		0.2		31	
MEAN	0.2	0.4	0.2	0.4	0.2	0.4	0.1	1.1	0.3	0.4	0.2	0.2	MEAN	
MAX.	0.6	1.0	0.4	3.4	0.9	3.8	0.3	7.5	1.6	3.2	1.1	0.7	MAX.	
MIN.	0.1	0	0	0.1	0	0	0	0	0.1	0	0	0	MIN.	
ACFT	15.6	26.9	13.4	27.2	12.2	25.7	7.7	62.6	19.5	21.3	13.4	13.4	ACFT	

* 1 SECOND-FOOT = 28.3 LITRES PER SECOND

FISCAL YEAR SUMMARY

MEAN		MAXIMUM					MINIMUM					TOTAL
DISCHARGE	RR.76	GAUGE HT	MO	DAY	TIME		DISCHARGE	GAUGE HT	MO	DAY	TIME	ACFT-Feet
0.34		1.10	10	11	0631		0	0	7	4	0200	254.40

APPENDIX B

**GROUND WATER EXTRACTION DATA
FOR INDIVIDUAL WELLS**

APPENDIX B: GROUND WATER EXTRACTION DATA FOR INDIVIDUAL WELLS

In acre-feet (1 acre-foot = 1 233 cubic metres)

STATE WELL NUMBER	OWNERS DESIG- NATION	1975						1976						TOTAL
		JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
WESTERN UNIT (MONK HILL BASIN)														
LA CANADA IRRIGATION DISTRICT														
1N/12W-06M055	DAYMI	0	0	0	0	0	0	0	0	0	0	0	6.84	6.84
1N/13W-01J025	NEW A	19.94	26.17	24.13	6.26	5.57	6.02	17.40	13.95	17.69	0	9.17	19.04	161.42
TOTALS:		19.94	26.17	24.13	6.26	5.57	6.02	17.40	13.95	17.69	0	9.17	25.92	188.26
LAS FLORES WATER COMPANY														
1N/12W-08M025	2	29.28	30.74	29.02	29.20	28.00	24.49	22.96	13.37	0	16.91	25.54	32.15	281.70
LINCOLN AVENUE WATER COMPANY														
1N/12W-05M015	3	94.14	99.41	84.04	84.94	44.92	28.84	2.55	.90	1.10	2.35	7.24	26.29	477.19
1N/12W-05M025	2	4.87	5.00	3.23	2.19	9.17	0	0	0	0	7.00	3.36	12.71	43.53
1N/12W-05M025	5	20.08	79.60	59.49	38.32	107.21	84.87	60.22	10.00	2.21	9.00	84.62	108.58	664.20
TOTALS:		119.09	184.41	146.76	125.50	161.30	113.71	62.77	10.90	3.31	14.35	95.24	147.58	1184.92
PASADENA CEMETERY ASSOCIATION														
1N/12W-05M015	4	2.05	.99	.82	.46	.14	.10	.21	.08	.50	.24	.61	.49	6.73
1N/12W-09E015	2-3	8.70	13.04	8.21	3.09	5.42	2.36	4.42	.74	3.74	4.43	9.62	10.90	76.27
TOTALS:		10.75	14.03	9.03	3.55	5.58	2.46	4.63	.42	4.24	4.69	10.23	11.39	83.00
PASADENA CITY OF														
1N/12W-05M015	AWROY	0	0	0	0	0	244.11	332.67	262.19	197.27	235.04	291.34	93.75	1656.37
1N/12W-05M015	VENTU	252.90	249.25	278.30	230.48	253.61	147.92	174.30	177.78	107.98	65.58	263.39	252.38	2453.87
1N/12W-08M025	WNO5W	123.90	10.03	74.39	20.19	4.04	32.80	34.64	0	64.42	31.67	0	.57	398.69
TOTALS:		376.80	259.28	352.69	250.67	257.64	424.83	541.61	439.97	371.67	332.29	554.71	346.70	4508.93
PURTO CANON LAND AND WATER ASSN														
1N/12W-08M015	5	176.45	164.32	149.05	81.07	82.42	56.97	31.13	32.19	21.88	37.03	145.84	166.80	1145.20
1N/12W-08M015	4	0	16.60	0	4.73	0	0	0	0	0	.03	.23	1.06	22.65
1N/12W-09M015	4	21.70	21.74	18.30	14.95	14.32	12.06	2.39	0	0	.03	.01	.01	105.51
1N/12W-09M015	2	0	0	0	0	0	0	11.54	11.31	11.10	12.14	16.75	19.41	82.25
TOTALS:		198.15	202.66	167.35	100.75	96.74	69.03	45.06	43.50	32.98	49.23	162.88	187.28	1355.61
VALLEY WATER COMPANY														
1N/12W-06M015	3	0	0	0	0	.02	0	0	.11	0	0	.03	0	.16
1N/12W-06M045	2	24.70	4.07	8.68	4.44	2.34	0	.09	5.98	11.38	8.48	50.14	57.40	177.76
1N/12W-06M065	1	2.64	1.81	1.50	0	.15	12.99	8.94	4.81	9.15	9.98	6.25	0	58.22
1N/12W-06M095	4	46.08	87.28	61.77	51.61	35.10	51.99	70.40	21.73	43.68	47.79	30.95	33.47	579.85
TOTALS:		71.42	93.14	71.95	56.09	37.63	64.98	70.43	32.63	64.21	64.25	87.37	90.87	815.94
SUBTOTALS (MONK HILL BASIN)		825.47	810.47	800.93	572.02	592.51	705.52	771.86	554.74	494.10	483.72	945.18	841.89	8398.41
(PASADENA SUBAREA)														
ALHAMBRA CITY OF														
1N/12W-34F015	2	81.09	82.44	79.82	79.52	83.71	87.00	81.52	75.63	81.31	74.31	77.65	25.54	909.74
1N/12W-34F045	6	.05	6.60	17.85	15.57	15.14	14.41	13.89	12.84	12.47	12.18	11.93	11.39	144.37
TOTALS:		81.14	89.24	97.67	95.09	98.85	101.41	95.41	88.47	93.78	86.49	89.58	36.93	1054.11
ARCATA CITY OF														
1N/11W-30M035	HRE10	175.25	175.30	157.25	158.10	116.32	34.11	0	0	0	2.39	159.94	164.28	1142.94
CALIFORNIA-AMERICAN WATER CO														
1N/12W-25F015	05WEG	99.84	91.88	99.47	85.70	73.23	69.73	80.52	45.99	62.17	105.22	109.37	86.16	1009.28
1N/12W-26M015	LAMAN	88.86	78.55	72.81	33.58	16.29	33.70	43.04	15.02	25.77	30.01	46.69	78.31	562.63
1N/12W-26M015	WINST	.34	6.40	97.94	93.93	32.68	0	0	0	13.37	46.18	71.28	68.26	430.38
1N/12W-34C015	PATON	55.09	49.14	43.72	17.49	5.61	1.07	3.70	2.39	8.35	34.39	58.85	42.53	322.32
1N/12W-34F025	06MKN	24.08	21.53	30.29	4.08	1.30	.32	5.58	5.70	1.25	2.56	6.72	35.61	140.02
1N/12W-35M015	LOMFA	107.73	99.70	102.95	38.95	11.82	.28	3.81	0	14.12	17.68	13.15	26.01	436.20
TOTALS:		375.94	347.20	447.18	273.73	140.93	105.10	176.65	69.10	125.03	236.03	306.06	337.88	2900.83
FAST PASADENA WATER COMPANY														
1N/11W-30J015	7	18.50	17.00	17.17	4.12	1.12	2.01	3.63	2.11	6.37	3.46	16.18	31.48	123.15
1N/11W-30M015	8	64.39	63.22	51.48	35.11	37.07	43.14	57.02	8.63	16.49	18.91	35.22	35.86	466.54
1N/11W-30M035	1	2.56	4.24	5.35	2.92	.20	.21	.24	.65	2.05	2.03	1.73	11.81	33.59
TOTALS:		85.45	84.44	74.00	42.15	38.39	45.36	60.89	11.39	24.91	24.40	52.73	79.15	623.28

APPENDIX B: (continued)

STAFF WELL NUMBER	OWNERS DESIG- NATION	PRODUCTION												TOTAL
		1975						1976						
		JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	

H F HUNTINGTON LIBRARY • ART GALLERY														
1N/12W-34H015	CANYN	5.00	4.05	22.35	4.56	0	0	0	.40	1.01	2.01	1.05	7.44	47.87
1N/12W-35C015	ORLOO	68.05	64.62	32.13	13.49	21.78	11.39	27.97	6.51	13.03	11.17	31.84	59.99	361.97
TOTALS:		73.05	68.67	54.48	18.05	21.78	11.39	27.97	6.91	14.04	13.18	32.89	67.43	409.84

KINNIFLOA IRRIGATION DISTRICT														
1N/11W-07N015	GLEN	6.88	4.73	5.70	4.53	5.97	6.12	5.29	5.87	4.97	1.24*	5.21	5.54	62.45
1N/12W-13F035	3	24.47	26.91	24.75	19.12	21.73	12.63	19.21	13.57	7.48	11.01*	27.48	38.51	246.87
1N/12W-13K015	WILCK	12.07	11.64	11.52	5.45	7.19	3.01	7.98	.91	4.41	1.98	0	0	66.16
1N/12W-13L015	WGNFR	.07	.06	.02	.02	.02	.01	.02	.01	.02	.01	.01	.04	.31
TOTALS:		43.49	43.34	41.99	29.12	34.91	21.77	32.50	20.76	16.88	14.24	32.70	44.49	375.79

MONROVIA, CITY OF														
1N/11W-30C015	CHAP6	112.46	112.98	108.33	99.38	112.33	111.62	2.27	1.61	1.51	90.47	94.96	90.09	937.81

PASADENA, CITY OF														
1N/11W-30D045	MCAP	245.96*	198.15*	203.87*	260.91*	238.61	227.27	134.69	0	0	45.25	230.34	142.07	1927.12
1N/12W-20A015	SUNST	172.53	165.87	49.19	0	0	127.23	132.98	0	85.22	128.22	129.14	152.30	1142.68
1N/12W-20H015	COPUS	206.78	203.94	63.56	0	0	66.58	131.88	26.09	74.23	169.88	129.92	198.90	1271.76
1N/12W-21C015	GARFO	145.21	169.71	134.17	168.74	194.75	194.00	134.56	67.73	74.03	112.45	117.20	129.78	1642.35
1N/12W-21F025	VILLA	0	0	0	0	0	341.10	262.27	0	0	0	0	0	603.37
1N/12W-23G015	CRAIG	136.76	154.50	148.07	133.26	163.62	127.00	148.99	49.29	63.95	89.33	77.91	142.16	1434.84
1N/12W-25H015	JODAN	92.62	205.81	97.82	244.49	198.43	63.53	85.41	0	0	0	28.50	20.49	1037.19
1N/12W-26C015	WIDBY	221.91	275.20	188.55	169.27	235.34	183.90	202.96	95.90	167.14	105.23	161.45	56.72	2063.57
TOTALS:		1221.77	1373.20	885.23	976.67	1030.75	1330.61	1273.74	279.01	464.57	650.76	874.55	842.42	11122.88

ROYAL LAUNDRY AND DRY CLEANING CO														
1N/12W-28H015	SWELL	11.41	11.11	10.52	11.48	10.32	11.35	10.44	9.95	11.77	11.78	10.46	11.06	131.65

SAN GABRIEL COUNTY WATER DISTRICT														
1N/12W-36E025	WN003	101.56	119.55	114.20	112.57	115.01	118.05	72.56	52.73	67.02	64.62	86.38	66.14	1090.99

SUNNY SLOPE WATER COMPANY														
1N/12W-36A015	6	0	105.49	159.56	105.03	89.11	24.19	96.65	18.11	102.41	216.95	222.16	207.32	1346.98
1N/12W-36H015	1	27.54	25.04	0	.09	.17	.03	48.63	96.82	109.59	66.70	101.78	93.82	570.21
TOTALS:		27.54	130.53	159.56	105.12	89.28	24.22	145.28	114.93	212.00	283.65	323.94	301.14	1917.19

SUBTOTALS		2309.06		2150.41		1809.52		1817.71		1071.51		2064.10		
(PASADENA SUBAREA)			2555.58		1921.46		1914.79		614.46		1477.61		2041.01	21707.31
TOTALS		3134.53		2951.34		2402.03		2589.57		1525.61		3009.37		
(WESTERN UNIT)			3366.05		2493.48		2620.31		1169.20		1961.33		2882.90	30105.72

EASTERN UNIT (SANTA ANITA SUBAREA)

ARCAJOIA, CITY OF														
1N/11W-21G025	OG01A	212.43	197.55	180.24	172.72	110.70	17.76	0	0	0	104.54	204.78	169.30	1369.62
1N/11W-21G055	OG005	0	8.07	0	51.36	16.90	3.13	0	0	0	48.18	96.08	86.59	310.31
1N/11W-21H025	OG024	206.77	194.55	180.26	168.11	107.31	16.99	0	0	0	87.94	174.92	154.47	1291.32
1N/11W-21H035	OG006	94.72	83.02	77.71	70.49	45.36	0	0	0	0	69.19	151.81	142.40	734.90
TOTALS:		513.92	483.19	438.21	462.68	280.27	37.88	0	0	0	310.05	627.19	552.76	3706.15

SIERRA MADRE, CITY OF														
1N/11W-21C025	4	87.96	89.89	0	0	66.19	54.09	78.59	44.63	60.24	45.10	100.11	74.86	701.66
1N/11W-21C035	3	63.46	70.29	39.82	90.43	63.14	19.38	29.90	22.74	23.21	19.30	12.38	79.37	493.02
1N/11W-21C065	5	60.59	62.74	111.55	72.90	15.70	32.19	21.04	18.38	36.91	25.04	73.48	33.91	564.45
1N/11W-21C075	6	75.17	115.90	121.76	21.27	26.52	39.03	44.68	15.75	14.86	24.78	19.09	84.38	605.19
TOTALS:		287.18	298.84	273.17	184.60	171.55	144.69	178.21	99.10	135.22	114.22	205.06	272.52	2364.32
TOTALS		801.10		711.34		451.82		178.21		135.22		832.25		
(EASTERN UNIT)			782.07		647.28		182.57		99.10		424.27		825.28	6070.47
GRAND TOTALS		3935.63		3662.68		2853.85		2767.78		1660.83		3841.62		
			4148.08		3140.76		2802.88		1268.30		2385.60		3708.18	36176.19

*ESTIMATED



APPENDIX C

WATER RIGHT LEASES



WATER RIGHT LICENSE AND AGREEMENT

W I T N E S S E T H:

For a valuable consideration, the City of Alhambra (licensor) grants to California-American Water Company (licensee): A license to extract 300 acre feet of licensor's "Decreed Right 1955" allocated to licensor under and pursuant to judgment dated December 23, 1944 and entered in Los Angeles Superior Court Case No. Pasadena C-1323 entitled "City of Pasadena vs. City of Alhambra et al" during the period commencing July 1, 1975 and continuing to and including June 30, 1976.

Said License is granted, subject to the following conditions:

- (1) Licensee shall exercise said right and extract the same on behalf of the City of Alhambra during the period above specified and put the same to beneficial use and licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of licensor.
- (2) Licensee shall notify the Watermaster that said pumping was done pursuant to this license and provide the Watermaster with a copy of this document within thirty (30) days thereof.
- (3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this license.
- (4) Licensee's "Decreed Right 1955" shall not be increased by the amount hereby leased when computing carryover or allowable overextraction as provided by Paragraph V and VI in said judgment.

The City of Alhambra warrants that it has 300 acre feet of "Decreed Right 1955" and that it has not pumped and will not pump or permit or license any other person to pump any part of said 300 acre feet during period of July 1, 1975 through June 30, 1976.

Dated: March 4, 1976

City of Alhambra

By: [Signature]
U. E. Mueller

Title: Director of Public Works

Dated: March 11, 1976

California-American Water Company

By: [Signature]

Title: District Manager

KINNELOA IRRIGATION DISTRICT

1999 Kinclair Drive
Pasadena, California 91407
(1-213) 797-6295

April 7, 1976

BOARD OF DIRECTORS
D. A. HOFFMAN, Chairman
L. E. STEEL, President
J. C. KENNEDY, Secretary
J. C. KENNEDY, Treasurer
J. C. KENNEDY, Secretary

D. W. HATFIELD
Treasurer
THE KINNELOA IRRIGATION DISTRICT
D. W. HATFIELD
General Manager

WATER RIGHT LICENSE AND AGREEMENT

For a valuable consideration, the Kinneloa Irrigation District hereby grants to H. E. Huntington Library and Art Gallery: A license to extract two hundred acre-feet of licensor's "Decreed Right 1955" allocated to licensor (or predecessors in interest) under and pursuant to judgment dated December 23, 1944 and entered in Los Angeles Superior Court Case No. Pasadena C-1323 entitled "City of Pasadena vs. City of Alhambra et al" during the period commencing July 1, 1975 and continuing to and including June 30, 1976.

Said License is granted, subject to the following conditions:

- 1) Licensee shall exercise said right and extract the same on behalf of Kinneloa Irrigation District during the period above specified and put the same to beneficial use and licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of the licensor.
- 2) Licensee shall notify the Watermaster that said pumping was done pursuant to this license and provide the Watermaster with a copy of this document within thirty (30) days thereof.
- 3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this license.
- 4) Licensee's "Decreed Right 1955" shall not be increased by the amount hereby leased when computing carryover or allowable overextraction as provided by Paragraph V and VI in said Judgment.

Kinneloa Irrigation District warrants that it has two hundred acre-feet of "Decreed Right 1955" and that it has not pumped and will not pump or permit or license any other person to pump any part of said two hundred acre-feet during period of July 1, 1975 through June 30, 1976.

Dated: April 12, 1976

Kinneloa Irrigation District

H. E. Huntington Library

SEAL By: [Signature]
Roy A. Hoffman, President

By: [Signature]

By: [Signature]
G. D. McCann, Secretary

For the consideration herein recited, KINNELOA IRRIGATION DISTRICT hereby grants to the CITY OF PASADENA a license to extract 155.20 acre-feet of Kinneloa's "Decreed Right 1955", and 294.80 acre-feet of Kinneloa's "Carry-over from 1973-74" allocated to Kinneloa (or predecessors in interest) under and pursuant to Judgment dated December 23, 1944, and entered in Los Angeles Superior Court Case No. Pasadena C-1323 entitled "City of Pasadena vs. City of Alhambra et al" during the period commencing July 1, 1975, and continuing to and including June 30, 1976.

Said License is granted, subject to the following conditions:

- (1) Pasadena shall exercise said right and extract the same on behalf of Kinneloa during the period above specified and put the same to beneficial use and Pasadena shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of Kinneloa.
- (2) Pasadena shall notify the Watermaster that said pumping was done pursuant to this License and provide the Watermaster with a copy of this document within thirty (30) days thereof.
- (3) Pasadena shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this license.
- (4) Pasadena's "Decreed Right 1955" shall be increased by the amount hereby leased when computing carryover or allowable overextraction as provided by Paragraph V and VI in said Judgment.
- (5) Pasadena agrees to pay Kinneloa the sum of \$18,000 within 60 days after date of this agreement.

KINNELOA warrants that it has 155.20 acre-feet of "Decreed Right 1955" and 294.80 acre-feet of "Carry-over from 1973-74" and that it has not pumped and will not pump or permit or license any other person to pump any part of said 450 acre-feet during period of July 1, 1975 through June 30, 1976.

DATED: June 11, 1976

KINNELOA IRRIGATION DISTRICT

By: [Signature]
(Title)

By: [Signature]
Secretary
(Title)

CITY OF PASADENA

By: [Signature]
Chairman of the Board of Directors
of the City of Pasadena

ATTEST:

[Signature]
Deputy City Clerk

WATER RIGHT LICENSE AND AGREEMENT NO. 9823

THIS WATER RIGHT LICENSE AND AGREEMENT, by and between the KINNELOA IRRIGATION DISTRICT, herein referred to as "Kinneloa", and the CITY OF PASADENA, a municipal corporation, herein referred to as "Pasadena",

THIS WATER RIGHT LICENSE AND AGREEMENT, by and between the EAST PASADENA WATER COMPANY, herein referred to as "East Pasadena", and the CITY OF PASADENA, a municipal corporation, herein referred to as "Licensee"

W I T N E S S E T H:

For the consideration herein recited, East Pasadena Water Company hereby grants to the CITY OF PASADENA a license to extract 150 acre-feet of East Pasadena's "Decreed Right 1955", allocated to East Pasadena (or predecessors in interest) under and pursuant to Judgment dated December 23, 1944, and entered in Los Angeles Superior Court Case No. Pasadena C-1323 entitled "City of Pasadena vs. City of Alhambra et al" during the period commencing July 1, 1975, and continuing to and including June 30, 1976.

Said License is granted, subject to the following conditions:

(1) Licensee shall exercise said right and extract the same on behalf of East Pasadena during the period above specified and put the same to beneficial use and Licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of East Pasadena.

(2) Licensee shall notify the Watermaster that said pumping was done pursuant to this License and provide the Watermaster with a copy of this document within thirty (30) days thereof.

(3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this license.

(4) Licensee's "Decreed Right 1955" shall not be increased by the amount hereby leased when computing carryover or allowable overextraction as provided by Paragraph V and VI of said Judgment.

(5) Licensee agrees to pay East Pasadena the sum of \$6,000 within 60 days after date of this agreement.

East Pasadena warrants that it has 150 acre-feet of "Decreed Right 1955" and that it has not pumped and will not pump or permit or license any other person to pump any part of said 150 acre-feet during period of July 1, 1975 through June 30, 1976.

DATED: June 15, 1976

CITY OF PASADENA

By [Signature]
Chairman of the Board of Directors
of the City of Pasadena

ATTEST:

[Signature]
City Clerk

EAST PASADENA WATER COMPANY

By [Signature]
[Signature]
(Title)

By _____
(Title)

Introduced by Director Donald F. Yokaitis

BE IT RESOLVED by the Board of Directors of the City of Pasadena that the Water Right License and Agreement presented herewith, between the City of Pasadena and East Pasadena Water Company pertaining to license to extract water from the Raymond Basin, be and the same hereby is approved, that the Chairman of the Board of Directors by and he hereby is authorized and directed to execute the same for and on behalf of the City, the City Clerk is directed to attest his signature and affix the corporate seal of the City thereto, and that the Director of Finance be and he hereby is authorized and directed to appropriate out of the Water Fund the sum of \$6,000 for the consideration set forth in said Water Right License and Agreement.

Adopted by the said Board of Directors by the following vote:

Ayes: Directors Heckman, Jones, Matthews, McKenney, White, Yokaitis
Noes: None
Absent: Director Wilfong

AGREEMENT TO PURCHASE WATER

This Agreement to purchase water is made and entered into this 6 day of April, 1976, between CITY OF SIERRA MADRE, a municipal corporation, hereinafter referred to as SIERRA MADRE, and the CITY OF ARCADIA, a municipal corporation, hereinafter referred to as ARCADIA.

This Agreement is made and based upon the following facts:

Both parties to this Agreement own adjudicated water rights in the Raymond Basin as original parties to the action entitled City of Pasadena v. City of Alhambra, Los Angeles Superior Court No. Pasadena C-1323, or as a successor-in-interest to such parties.


Said rights, as originally adjudicated, have been modified and SIERRA MADRE now owns rights designated as Decreed Right 1955 giving SIERRA MADRE the right to pump or otherwise extract 1764 acre feet of water in 1975-76 from the Eastern Unit of the Raymond Basin.

SIERRA MADRE has available for purchase 500 acre feet of water in said Eastern Unit for the fiscal year ending June 30, 1976.

SIERRA MADRE desires to grant to ARCADIA the right to purchase 500 acre feet of its Decreed Right 1955 available to be pumped during the 1975-76 fiscal year for the consideration and on the terms and conditions set forth below.

ARCADIA desires to have the right to purchase 500 acre feet of said Decreed Right 1955 for the consideration and on the terms and conditions set forth below.

CITY OF SIERRA MADRE
a municipal corporation


Mayor of the City of Sierra Madre

City Clerk

CITY OF ARCADIA
a municipal corporation

Charles E. Gill
Mayor of the City of Arcadia

CITY COUNCIL

FLORETTA & LAUBER
NASH

JACK SAELID
MAJOR AND TEMPORARY

CHARLES E GILB
ROBERT O MARGETT
DAVID E PARRY

LYMAN H COZAD
SILVERDALE

City of Arcadia

240 WEST HUNTINGTON DRIVE
ARCADIA, CALIFORNIA

CHRISTINE VAN HAAREN

July 6, 1976

City of Sierra Madre
55 West Sierra Madre Blvd.
Sierra Madre, California 91024

Attention: Mr. Bernard P. Westkamper
Director of Public Works

Gentlemen:

In accordance with our "Agreement to Purchase Water" dated April 6, 1976, we hereby notify you that the City of Arcadia has pumped 183.69 acre feet of the City of Sierra Madre's "Decreed Right 1955" from the eastern unit of the Raymond Basin during the Fiscal Year ending June 30, 1976.

Very truly yours,

Robert G. Berlien
Water Manager

RGH: 12

Copy: State of California - Resources Agency
Department of Water Resources

MAILING ADDRESSES		TELEPHONES
CITY HALL	P O BOX 50	STOCK
LEONARD	30 W DUARTE ROAD	STOCK
MAYNARD	P O BOX 50	STOCK
		STOCK

APPENDIX D

**PROGRAM FOR SPREADING CREDIT CERTIFICATION
BY LACFCD AND WATERMASTER**


**PROGRAM FOR SPREADING CREDIT
CERTIFICATION BY LACFCD
AND WATERMASTER**


In acre-feet (1 acre-foot = 1 233 cubic metres)

Month/Year	Kinneloa Irrigation District		Las Flores Water Company		Lincoln Avenue Water		City of Pasadena				Rubio Canon Land & Water Association	
	Diverted	Spread	Diverted	Spread	Diverted	Spread	Arroyo Seco		Eaton Canyon		Diverted	Spread
July 1975	0	0	2.08	2.08	40.17	40.17	0	0	42.41	42.41	6.21	6.21
Aug. 1975	0.08	0.08	1.76	1.76	34.29	34.29	0	0	29.04	29.04	7.00	7.00
Sept. 1975	0.24	0.24	1.64	1.64	34.81	34.81	0	0	20.16	20.16	6.68	6.68
Oct. 1975	0.36	0.36	3.50	3.50	34.00	34.00	0	0	50.56	50.56	6.48	6.48
Nov. 1975	0.75	0.75	1.40	1.40	28.55	28.55	0	0	56.80	56.80	6.47	6.47
Dec. 1975	1.17	1.17	1.64	1.64	21.39	21.39	0	0	55.52	55.52	6.77	6.77
Jan. 1976	0.61	0.61	1.61	1.61	21.72	21.72	2.81	2.81	61.36	61.36	6.81	6.81
Feb. 1976	0.17	0.17	3.10	3.10	43.91	43.91	57.93	57.93	139.65	139.65	9.49	9.49
Mar. 1976	0	0	2.84	2.84	40.18	39.09	1.46	1.37	91.50	91.50	13.72	13.72
Apr. 1976	0.13	0.13	1.40	1.40	35.17	35.17	22.24	22.24	164.76	164.76	8.73	8.73
May 1976	0	0	1.53	1.53	34.24	34.24	0	0	154.74	154.74	7.50	7.50
June 1976	0	0	3.45	3.45	23.63	23.63	0	0	112.90	112.90	6.41	6.41
TOTAL	3.51	3.51	25.95	25.95	392.06	390.97	84.44	84.35	979.40	979.40	92.27	92.27

The Watermaster has reviewed the above figures and certifies that the amounts shown as diverted are correct.

The LACFCD has reviewed the above figures and certifies that the amounts shown as spread are correct.


C. B. Arnold
Deputy Watermaster
Department of Water Resources


C. J. Reinhard
Supervising Civil Engineer II
Los Angeles County Flood Control District

CONVERSION FACTORS

English to Metric System of Measurement

<u>Quantity</u>	<u>English unit</u>	<u>Multiply by</u>	<u>To get metric equivalent</u>
Length	inches (in)	25.4	millimetres (mm)
		.0254	metres (m)
	feet (ft)	.3048	metres (m)
	miles (mi)	1.6093	kilometres (km)
Area	square inches (in ²)	6.4516×10^{-4}	square metres (m ²)
	square feet (ft ²)	.092903	square metres (m ²)
	acres	4046.9	square metres (m ²)
		.40469	hectares (ha)
		.40469	square hectometres (hm ²)
		.0040469	square kilometres (km ²)
	square miles (mi ²)	2.590	square kilometres (km ²)
Volume	gallons (gal)	3.7854	litres (l)
		.0037854	cubic metres (m ³)
	million gallons (10 ⁶ gal)	3785.4	cubic metres (m ³)
	cubic feet (ft ³)	.028317	cubic metres (m ³)
	cubic yards (yd ³)	.76455	cubic metres (m ³)
	acre-feet (ac-ft)	1233.5	cubic metres (m ³)
		.0012335	cubic hectometres (hm ³)
		1.233×10^{-6}	cubic kilometres (km ³)
Volume/Time			
(Flow)	cubic feet per second (ft ³ /s)	28.317	litres per second (l/s)
		.028317	cubic metres per second (m ³ /s)
	gallons per minute (gal/min)	.06309	litres per second (l/s)
		6.309×10^{-5}	cubic metres per second (m ³ /s)
	million gallons per day (mgd)	.043813	cubic metres per second (m ³ /s)
Mass	pounds (lb)	.45359	kilograms (kg)
	tons (short, 2,000 lb)	.90718	tonne (t)
		907.18	kilograms (kg)
Power	horsepower (hp)	0.7460	kilowatts (kW)
Pressure	pounds per square inch (psi)	6894.8	pascal (Pa)
Temperature	Degrees Fahrenheit (°F)	$\frac{t_F - 32}{1.8} = t_C$	Degrees Celsius (°C)

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